Research Vessel Bottom Trawl Survey Report (NL Region): A stock-by-stock summary of survey information up to and including the 2017 spring and autumn surveys

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by

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ABSTRACT

Rideout, R. M., and D. W. Ings. 2018. Research Vessel Bottom Trawl Survey Report (NL Region): A Stock-By-Stock Summary Of Survey Information Up To And Including The 2017 Spring And Autumn Surveys. Can. Tech. Rep. Fish. Aquat. Sci. Fs97-6/3267E-PDF: vii + 59 p.

DFO in the Newfoundland and Labrador Region conducts an annual Autumn Research Vessel (RV) Multi-Species Bottom-trawl survey in parts of SA2 + SA3 as well as a Spring RV Multi-Species Bottom Trawl survey in parts of SA3. The primary goal of these surveys is to provide information on species distribution and abundance. Although stock-specific science advice is only provided through the process of a full stock assessment, DFO Resource Management regularly request updates on survey indices in non-assessment years as background for discussions with various stakeholders and in order to determine which stocks should be reviewed in more detail. This document provides a summary of RV bottom trawl survey information since the mid-1990s along with several caveats on how these data can and should be interpreted.

RÉSUMÉ

Rideout, R. M., and D. W. Ings. 2018. Research Vessel Bottom Trawl Survey Report (NL Region): A Stock-By-Stock Summary Of Survey Information Up To And Including The 2017 Spring And Autumn Surveys. Can. Tech. Rep. Fish. Aquat. Sci. Fs97-6/3267E-PDF: vii + 59 p.

La Région de Terre-Neuve-et-Labrador de Pêches et Océans Canada (MPO) effectue chaque automne un relevé plurispécifique au chalut de fond au moyen de navires scientifiques dans certaines parties des divisions SA2 et SA3, et un relevé similaire au printemps dans certaines parties de la division SA3. L'objectif principal de ces relevés est de fournir des renseignements sur la répartition et l'abondance des espèces. Même si un avis scientifique propre à chaque stock n'est produit qu'à la suite d'une évaluation complète du stock, la Gestion des ressources du MPO demande régulièrement des mises à jour sur les indices des relevés durant les années où il n'y a pas d'évaluation, afin d'éclairer les discussions avec divers intervenants et de déterminer quels stocks devraient être examinés de plus près. Le présent document fournit un résumé des renseignements tirés des relevés au chalut de fond effectués depuis le milieu des années 1990, ainsi que plusieurs mises en garde sur la façon dont ces données peuvent et devraient être interprétées.

CONTEXT

DFO in the Newfoundland and Labrador Region conducts an annual Autumn Research Vessel (RV) Stratified Random Multi-Species Bottom-trawl survey in parts of NAFO Sub-area (SA) 2 + SA3 as well as a Spring RV Multi-Species Bottom Trawl survey in parts of SA3. These surveys provide information on species distribution and abundance of various groundfish and shellfish species as well as other biological information (growth rates, maturation schedules, etc.). Survey data represent a critical component of most science-based stock assessments. During a full assessment, survey data are considered in conjunction with other data sources (e.g. fishery-dependent data), ideally (but not always) within the construct of an analytical population dynamics model in order to provide risk-based advice to fishery managers. Survey data on their own should not be considered as science advice. However, DFO Resource Management regularly request updates on survey indices as background for discussions with various stakeholders and in order to determine which stocks should be reviewed in more detail. In some cases, stocks have formalized "triggers" in place that determine when a full assessment is needed based on patterns/changes in survey indices. Stakeholders also commonly request summaries of survey data for various by-catch species as part of the ecocertification process for fisheries. It is the objective of the current document to satisfy both types of requests, with plans to update this document annually.

BACKGROUND

Fisheries and Oceans Canada has conducted annual stratified random multispecies trawl surveys covering offshore areas in NAFO SubAreas 2+3 in the spring since 1971 and autumn since 1990. Spring surveys currently cover Divs. 3LNOP, while autumn surveys cover Divs. 2HJ3KLNO. These surveys have gone through multiple vessel and gear changes since their inception, as well as multiple changes in planned survey coverage (see Brodie, 2005, Brodie and Stansbury, 2007, Rideout et al., 2017). Since the autumn 1995 and spring 1996 surveys, the gear used has been the Campelen 1800 shrimp trawl. The research vessels used to conduct the surveys over that time period have been a combination of the *CCGS Wilfred Templeman* (decommissioned in 2008), *CCGS Alfred Needler*, and *CCGS Teleost*. Generally, two vessels were used to complete the autumn survey and only a single vessel used to conduct the spring survey (unless mechanical issues and/or time constraints required the use of the second vessel). The spring surveys cover depths down to a maximum of 732 m, whereas the autumn surveys extend down to 1500 m.

These surveys are stratified by depth range. Survey "sets" (i.e. standardized fishing hauls at a randomly selected sampling unit) for these stratified-random surveys are distributed using a proportional-allocation scheme, whereby the number of sets allocated for a given stratum is proportional to the stratum area, subject to the condition that each stratum must be allocated a minimum of two sets. Tow sites are randomly selected from sampling units within each stratum (Doubleday, 1981). Within each stratum, one alternate station is also selected, and is occupied if a sample from one of the other units cannot be obtained (e.g. untrawlable bottom). When computing the stratified estimators of abundance or biomass for any given species, individual strata must have a minimum of two successful survey sets to be considered completed and in order to enable calculation of stratum variance.

Prior to the use of the Campelen trawl in the autumn and spring RV surveys, the gear used was the Yankee 41.5 otter trawl (1971-1982) and the Engel 145 Hi-rise trawl (1983-1994). The selectivity of these gears are not equal and therefore results from earlier surveys are not necessarily comparable to recent surveys. In some cases (i.e. for some species/stocks), comparative fishing with the two gears has allowed data collected with one gear to be converted to units equivalent to another gear (i.e. convert from Engel trawl units to Campelen trawl units). This is particularly useful for stock assessment purposes, where a longer time series can provide greater insight to stock dynamics and therefore increase the ability to provide science advice with respect to specific management options. However, given that the data presented herein are not meant to be interpreted as science advice, and that such conversions are only available for a subset of species/stocks, we focus only on data collected during the Campelen time series.

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Brodie, W. (2005) A Description of the Autumn Multispeices Surveys in SA2+Divisions 3KLMNO from 1995-2004. NAFO SCR Doc. No. 05/8.

Brodie, W., Stansbury, D. (2007) A Brief Description of Canadian Multispeices Surveys in SA2+Divisions 3KLMNO from 1995-2006. NAFO SCR Doc. No. 07/18.

Doubleday, W.G. (1981) Manual on groundfish surveys in the Northwest Atlantic. *NAFO Scientific Council Studies* **2,** 7-55.

Rideout, R.M., Power, D., Ings, D.W., Wheeland, L.J., Healey, B.P. (2017) Canadian multi-species bottom trawl surveys in NAFO subarea 2 + Divisions 3KLNOPs: Vessel performance, catch distribution and survey biomass trends of key finfish resources with emphasis on 2016. NAFO SCR Doc. No. 17/044.

NOTES FOR STOCK-BY-STOCK SUMMARIES

Before examining the stock-by-stock survey plots, it is important to understand what these data represent and what can and should not be interpreted from these plots. Readers should understand the below points before proceeding.

The following plots illustrate data collected during multi-species research vessel bottom trawl surveys conducted by the Science Branch of the Newfoundland and Labrador region of Fisheries and Oceans Canada. These data on their own do not necessarily provide a complete picture of stock status. Only the recent Campelen trawl time series are presented here and perceptions of stock status may differ when other data sources, including older survey time series, are considered. For details of stock status, readers are directed to the pertinent stock assessment documents available either through NAFO (https://www.nafo.int/) or the Canadian Science Advisory Secretariat (http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm).

The plots presented here are based on all available data (i.e. all strata) and therefore may not agree exactly with survey indices presented in assessment documents - if those assessments are based on a subset of the data (i.e. index strata).

Mechanical, logistical and other issues sometimes prevent the RV survey from covering all intended areas. This partial coverage has the potential to influence survey indices and therefore years with partial survey coverage are sometimes excluded from stock assessments. These decisions are made during the peer review process of full assessments. Any previous decisions to exclude year's with only partial survey coverage are reflected in the current plots. Differential colours/symbols are used to identify survey data with potential coverage issues that have been collected since the last assessment. Decisions on the suitability of these data will be made during the next full assessment for the stock in question. Until these data are fully evaluated they should be interpreted with caution.

The plots of survey biomass and abundance presented herein should be taken only as indices and not as absolute estimates of stock size. The data within these plots should only be viewed with respect to trends over time or the stock size from one period relative to another (within the same time series). The scale values on the y-axes are not meaningful and in some cases, one of the indices has been scaled up (by factors of 10) to make the two indices viewable on the same y-axis.

Length-frequency plots are scaled on a stock-by-stock basis to allow the length composition to be easily viewed. This scaling often differs among stocks and therefore these plots should only be used to examine the size groupings of fish within a stock and should not be used to compare mean numbers per tow at length among different stocks.

In accordance with Fisheries and Oceans Canada's data management policies, RV survey data go through a rigorous quality control process and are then archived to ensure long-term data security and to ensure data are available to all researchers within the Department. Starting in 2012, however, for some species fish are frozen at sea during the autumn survey and accurate and detailed measurements are made back at the lab. For these species, data have not been entered back into the shared archive and are therefore not available for this report. Without recent information, it was decided that summaries of autumn survey data for these stocks were of little value and hence no plots are presented. A note is made for these stocks to indicate that the autumn data do exist but have not been archived.

FIGURES

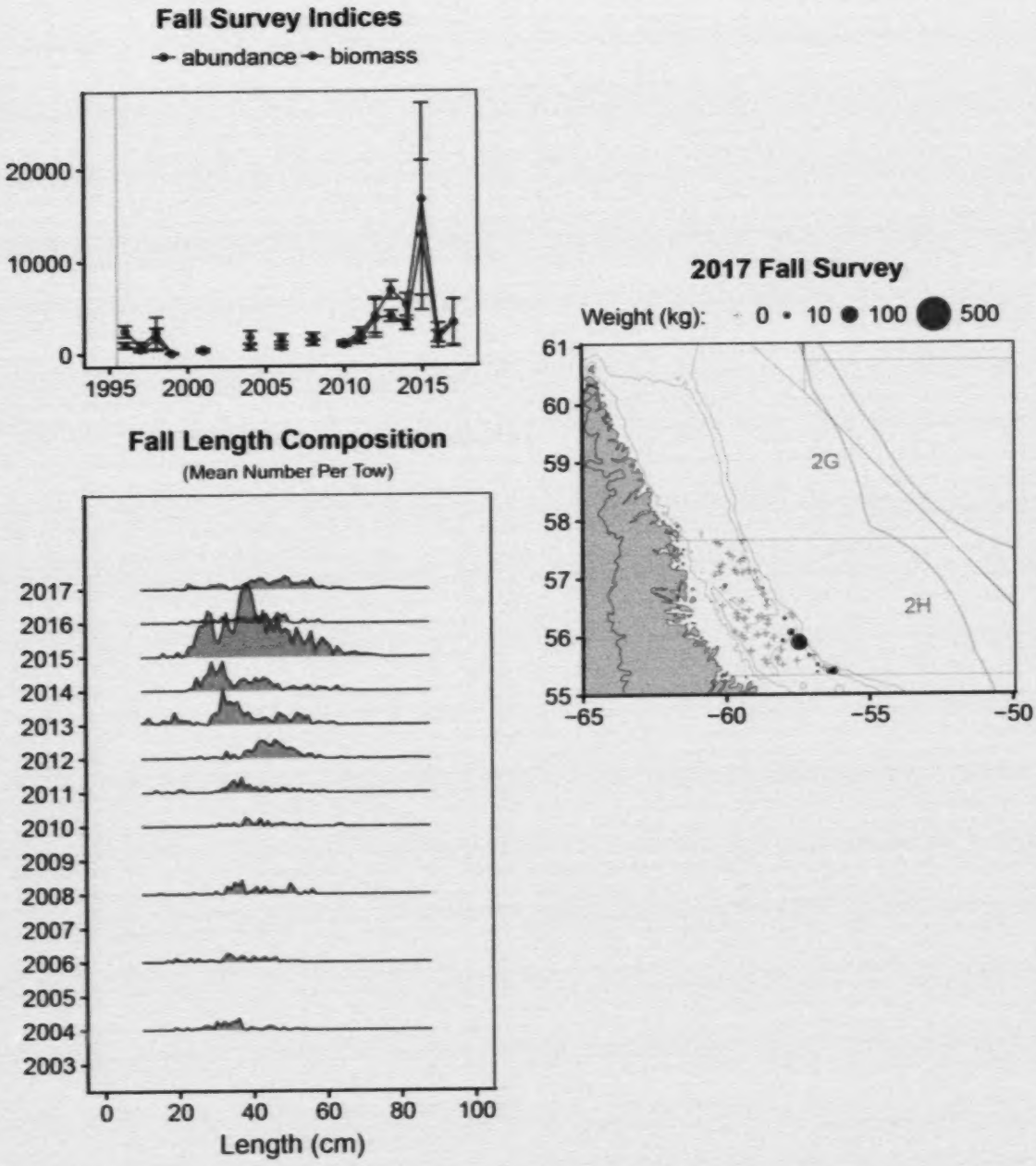


Figure 1. Atlantic Cod (*Gadus morhua*) in Divs. 2GH. Note that data presented here are for Div. 2H only. Div. 2G has not been covered in the survey since 1999. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed.

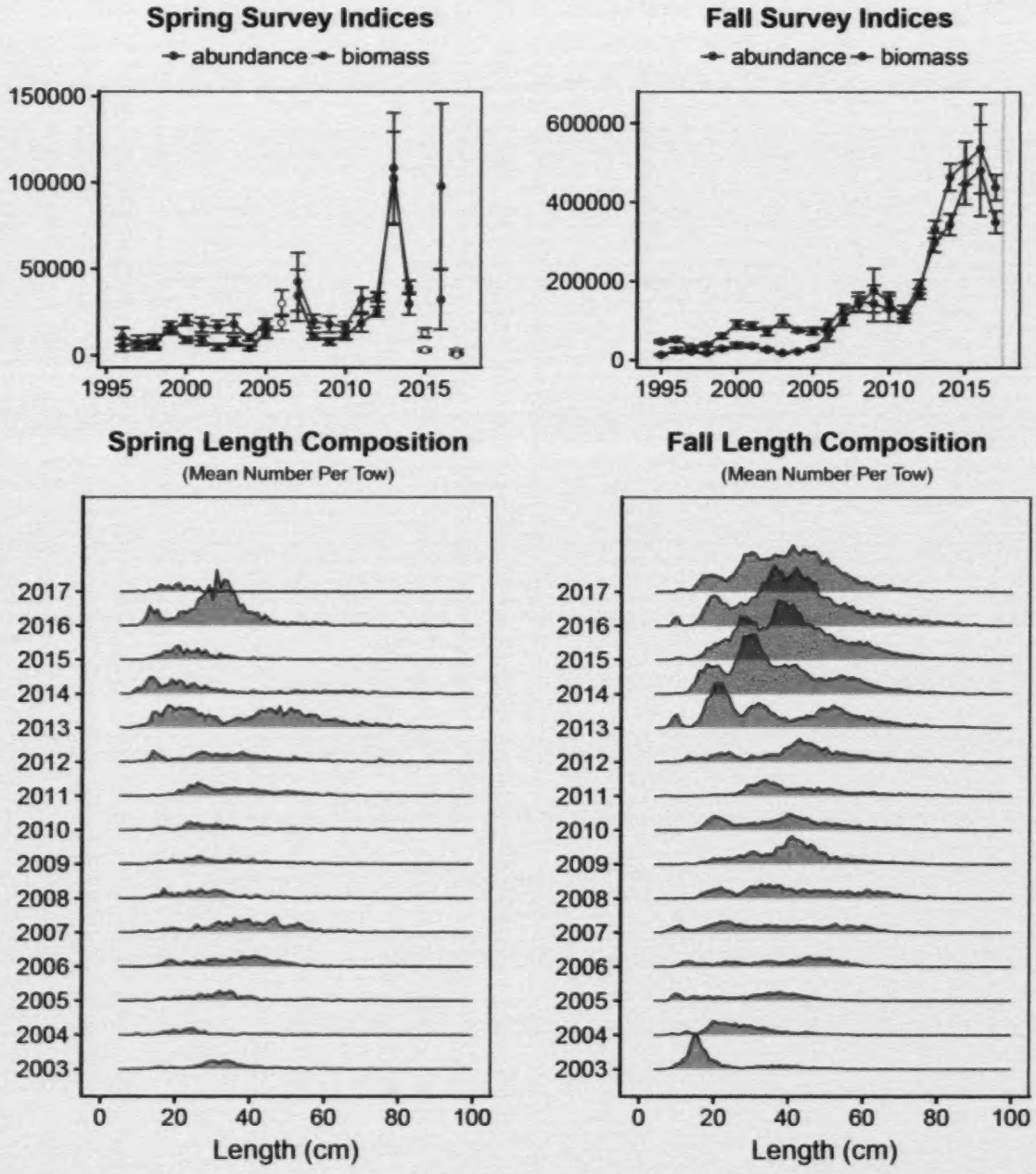


Figure 2. Atlantic Cod (*Gadus morhua*) in Divs. 2J3KL. Note that the spring survey covers Div. 3L, but not 2J3K. Spring survey data are not currently used in the assessment of this stock. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Open symbols (above) and red frequencies (below) indicate questionable/potentially invalid data points due to survey coverage issues.

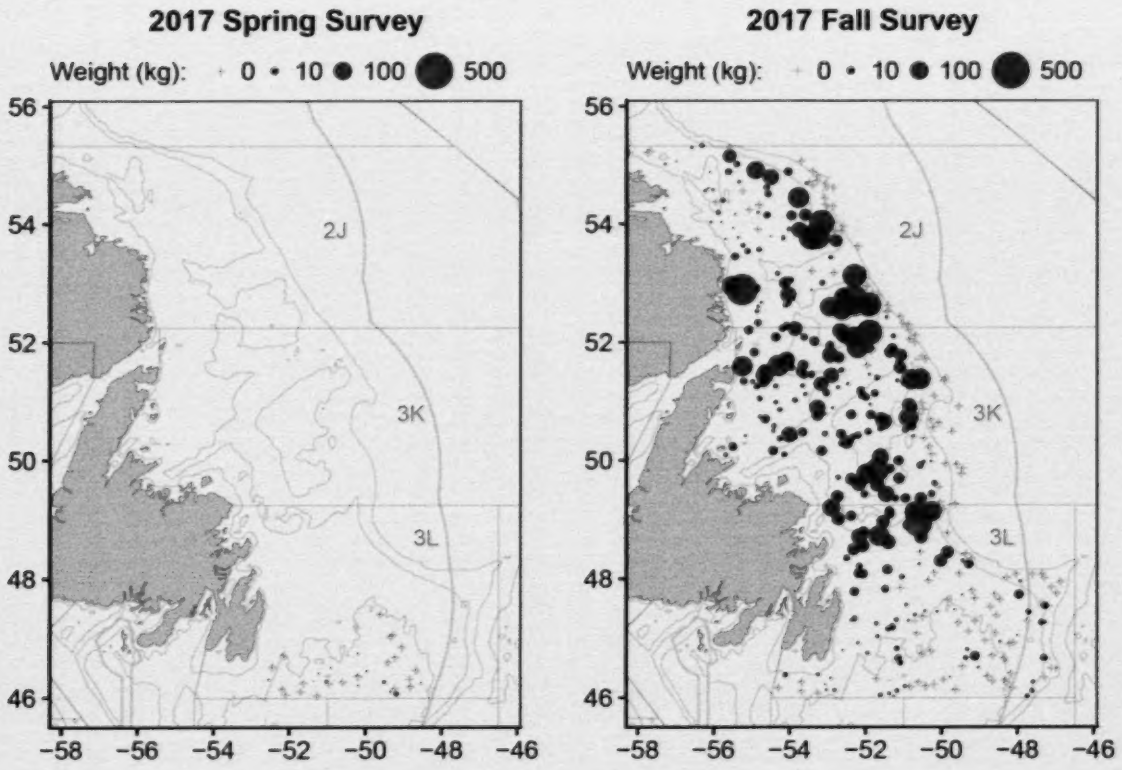


Figure 2. Atlantic Cod (*Gadus morhua*) in Divs. 2J3KL (continued).

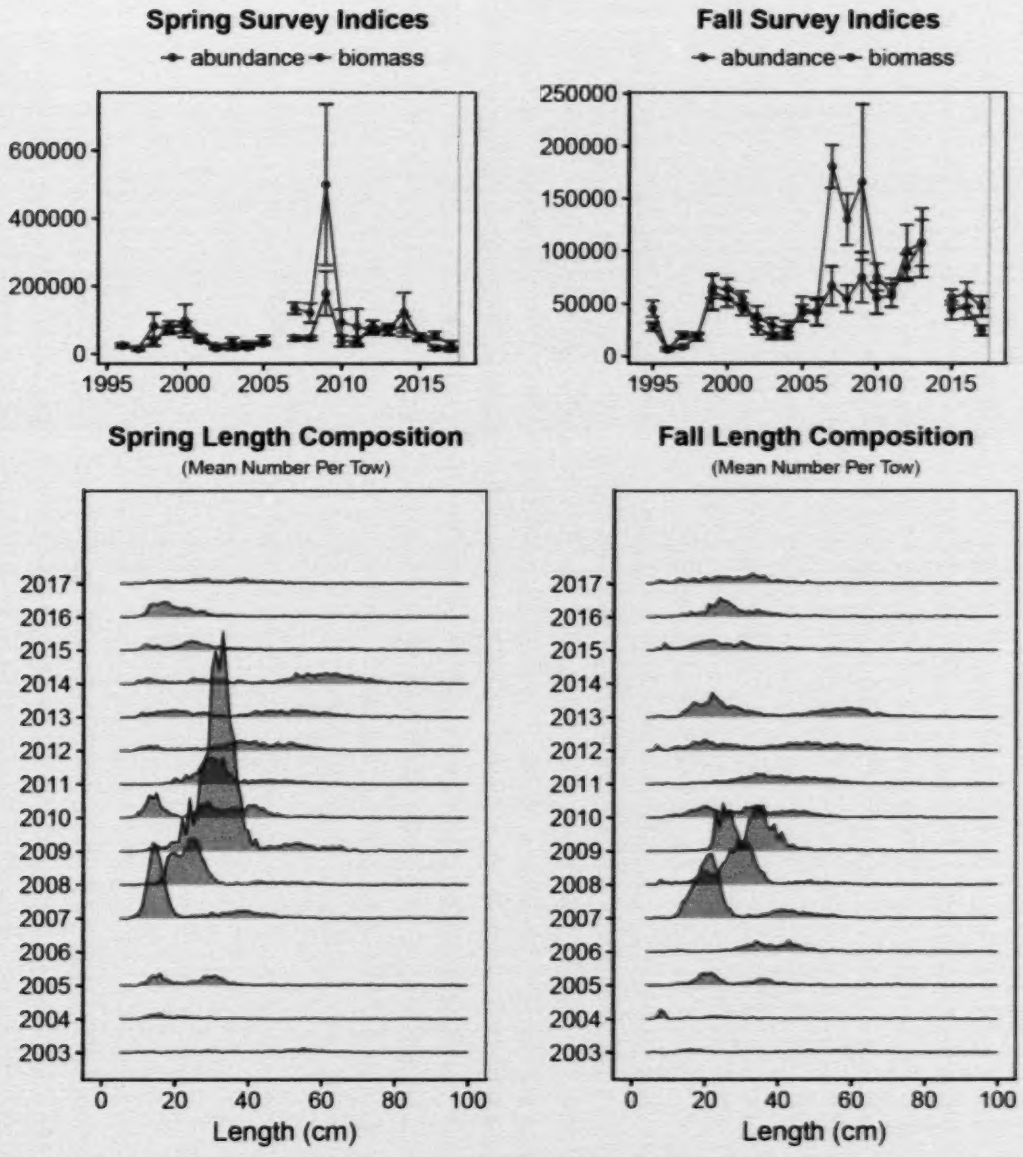


Figure 3. Atlantic Cod (*Gadus morhua*) in Divs. 3NO. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed.

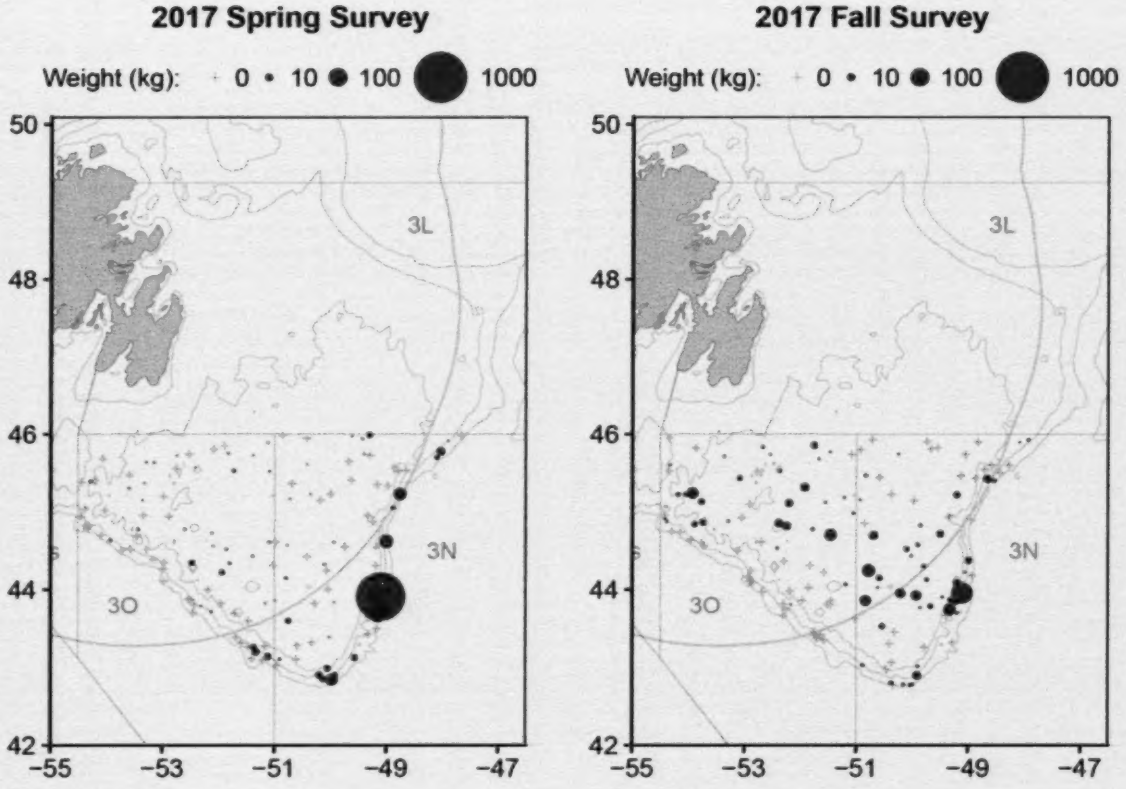


Figure 3. Atlantic Cod (*Gadus morhua*) in Divs. 3NO (continued).

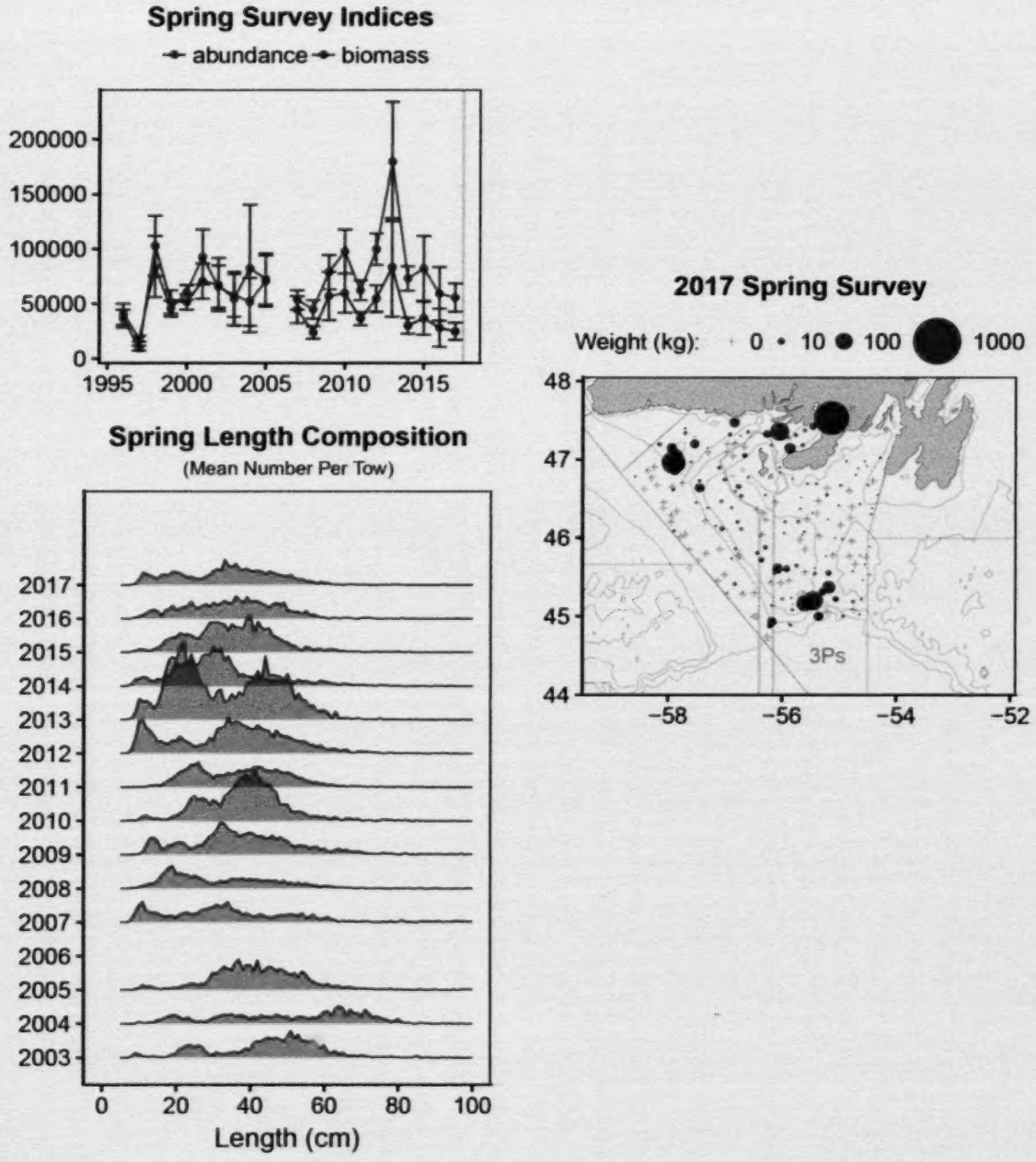


Figure 4. Atlantic Cod (*Gadus morhua*) in Subdiv. 3Ps. Data to the left of the vertical line were used in the most recent assessment of this stock. Any data to the right of the line have not been peer reviewed. Note that the autumn survey does not cover any portion of the stock area.

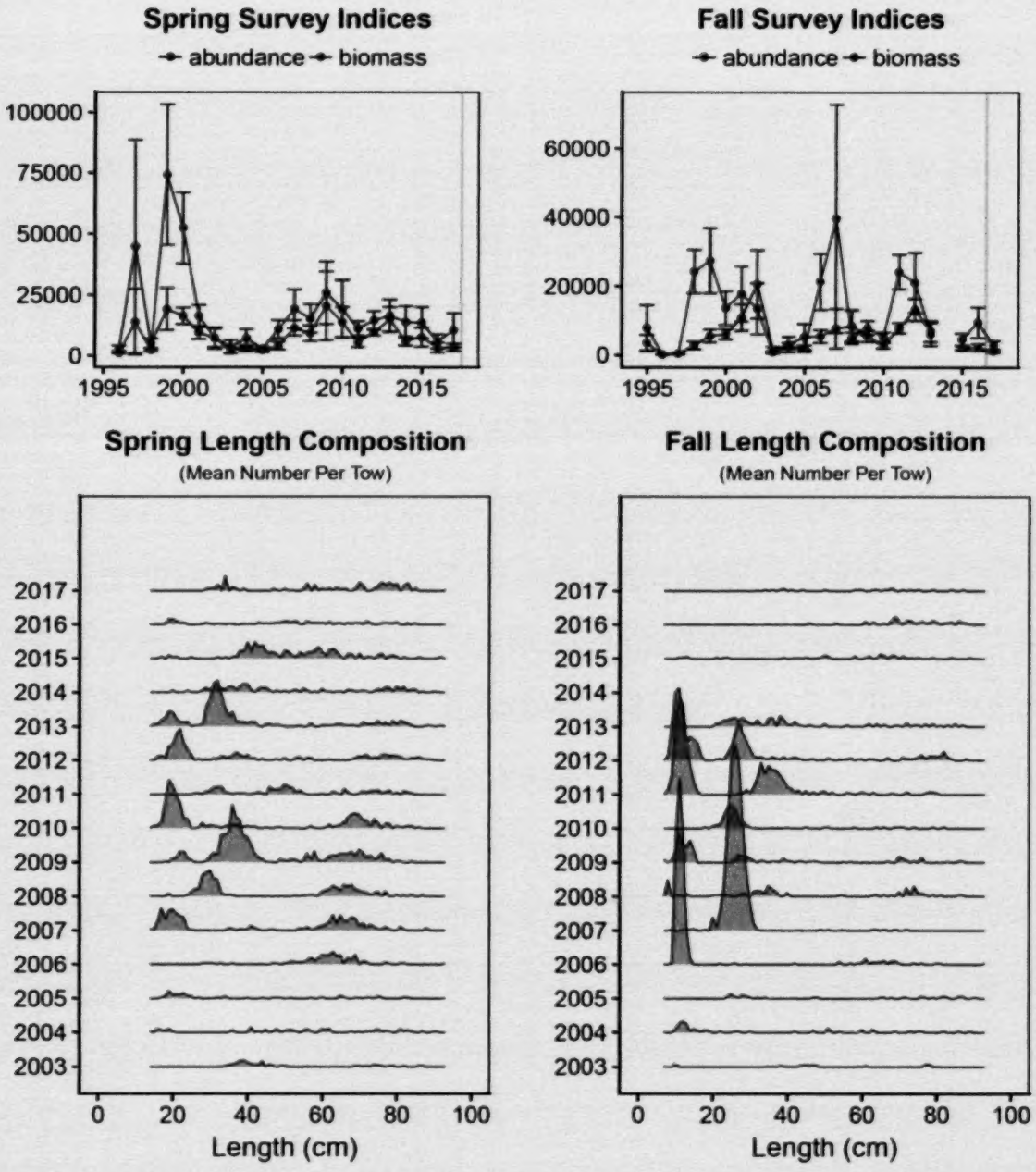


Figure 5. Haddock (*Melanogrammus aeglefinus*) in Divs.3LNO. Data to the left of the vertical line were used in the most recent assessment of this stock. Any data to the right of the line have not been peer reviewed. Note that the autumn survey does not cover any portion of the stock area.

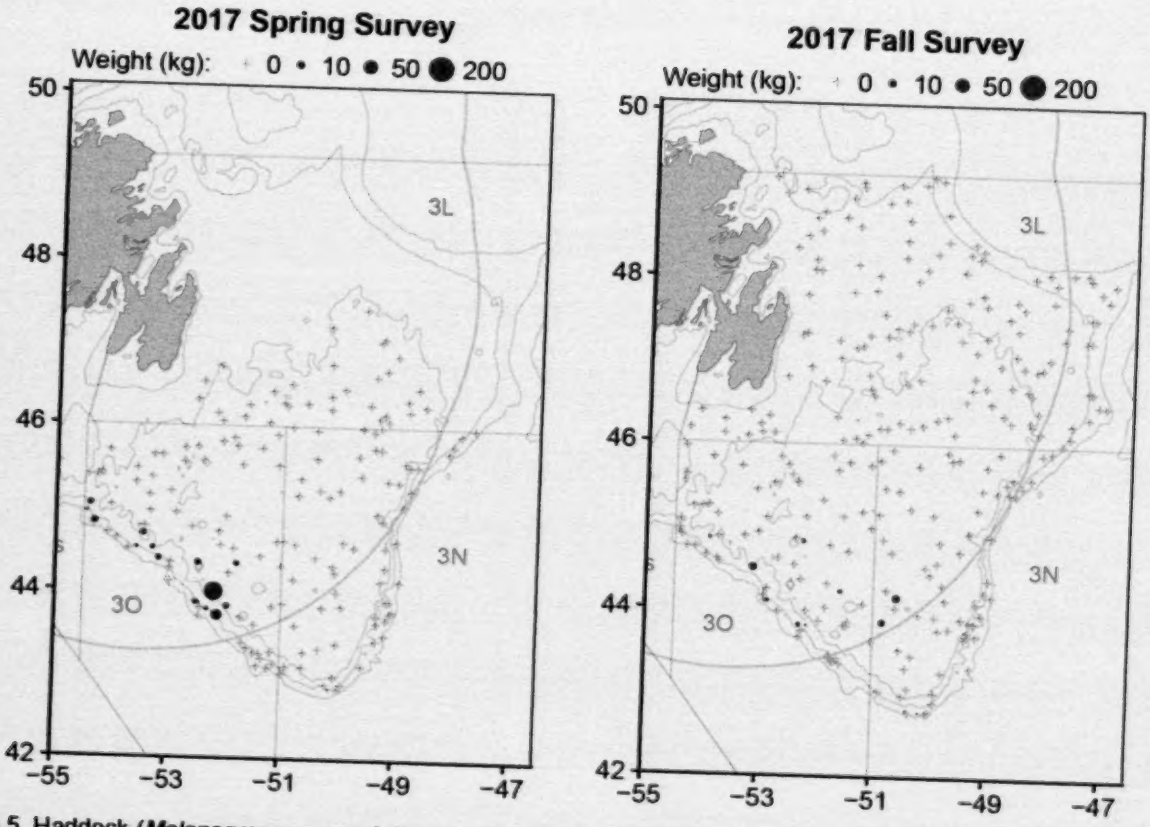


Figure 5. Haddock (*Melanogrammus aeglefinus*) in Divs. 3LNO (continued).

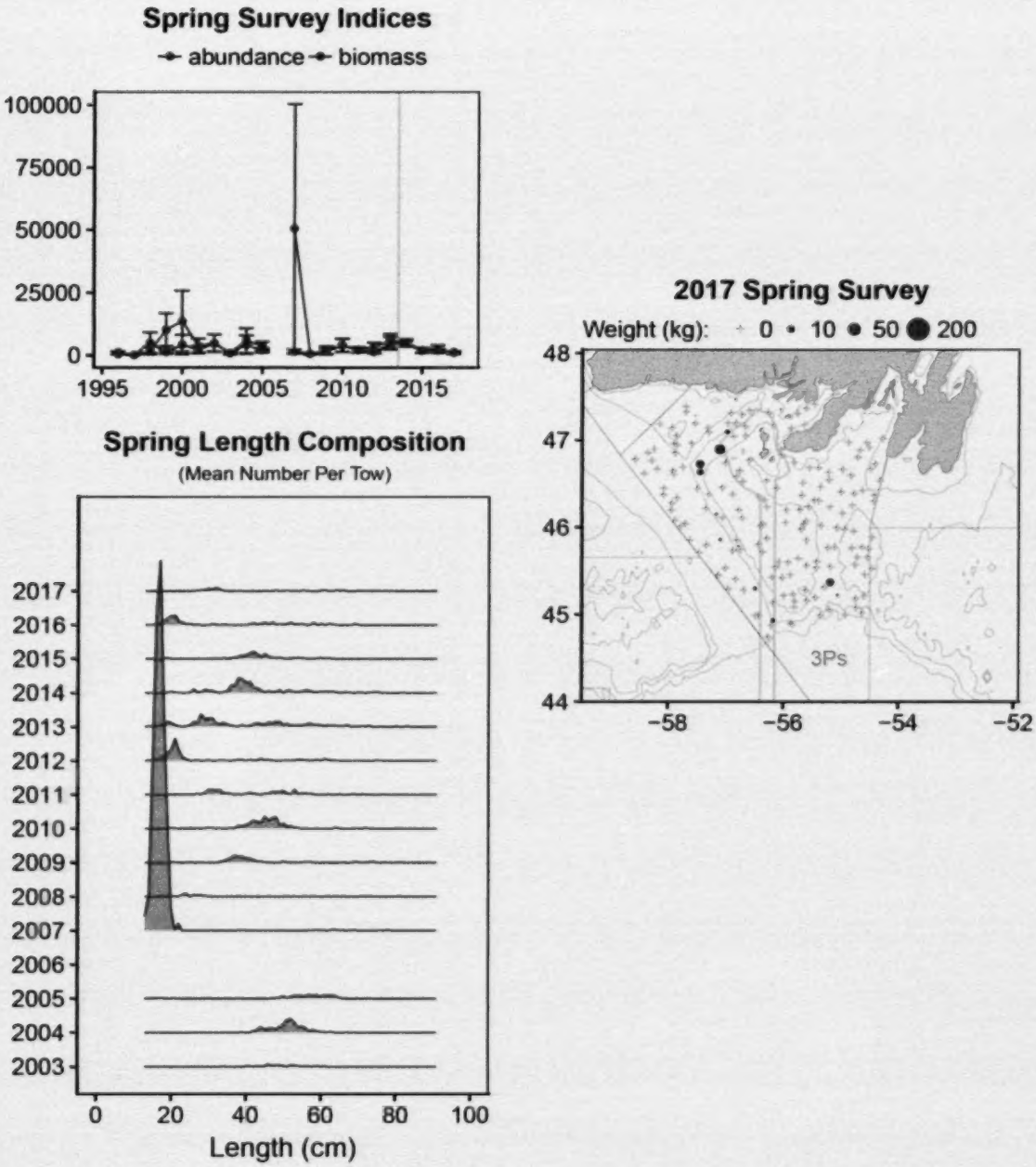


Figure 6. Haddock (*Melanogrammus aeglefinus*) in Subdiv. 3Ps. Data to the left of the vertical line were used in the most recent assessment of this stock. Any data to the right of the line have not been peer reviewed. Note that the autumn survey does not cover any portion of the stock area.

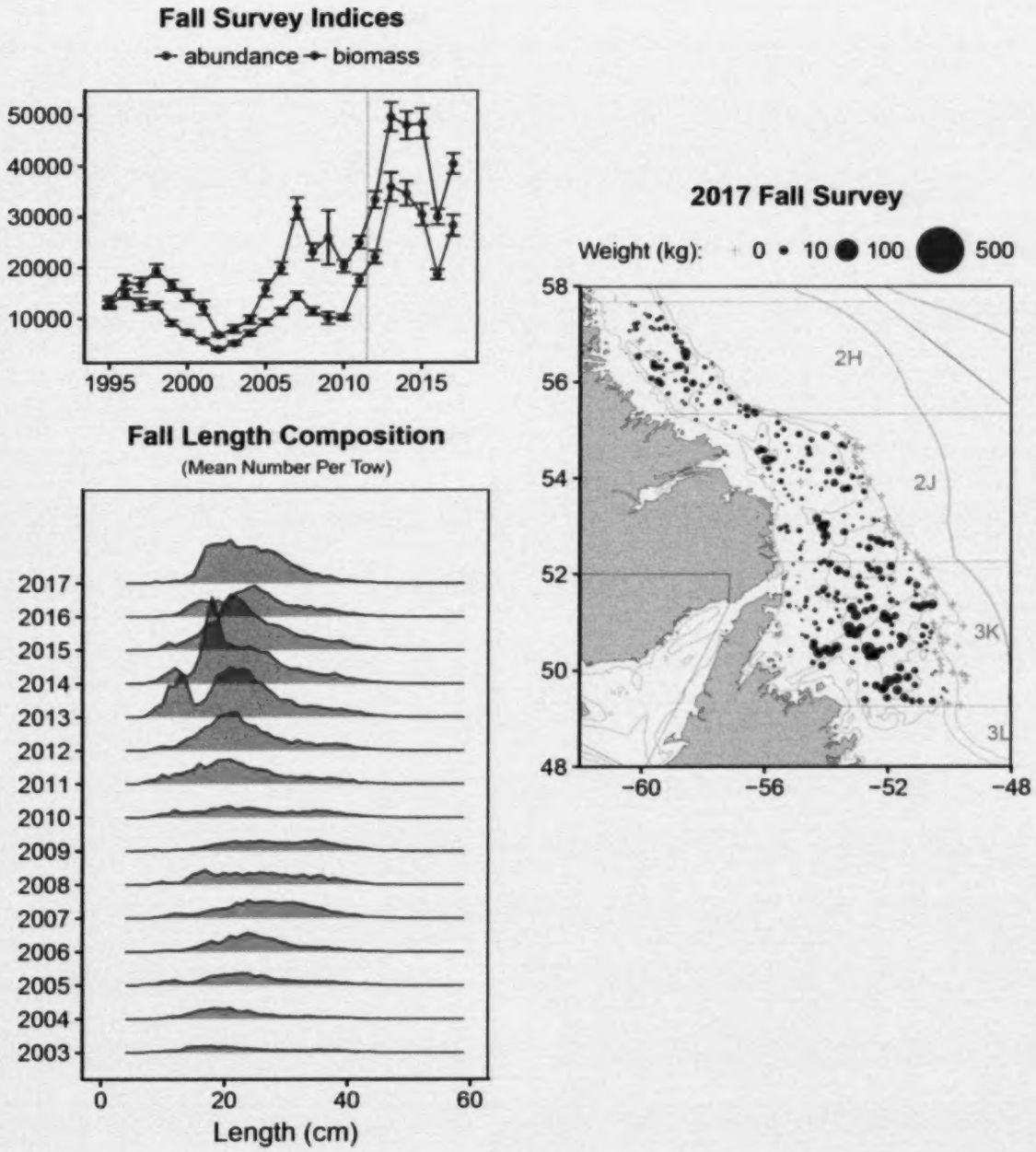


Figure 7. American Plaice (*Hippoglossoides platessoides*) in SA2+Div. 3K. Note that only data for Divs. 2J3KL are included in the index and length frequency plots. Data to the left of the vertical line were used in the most recent assessment of this stock. Any data to the right of the line have not been peer reviewed. Note that the spring survey does not cover any portion of the stock area.

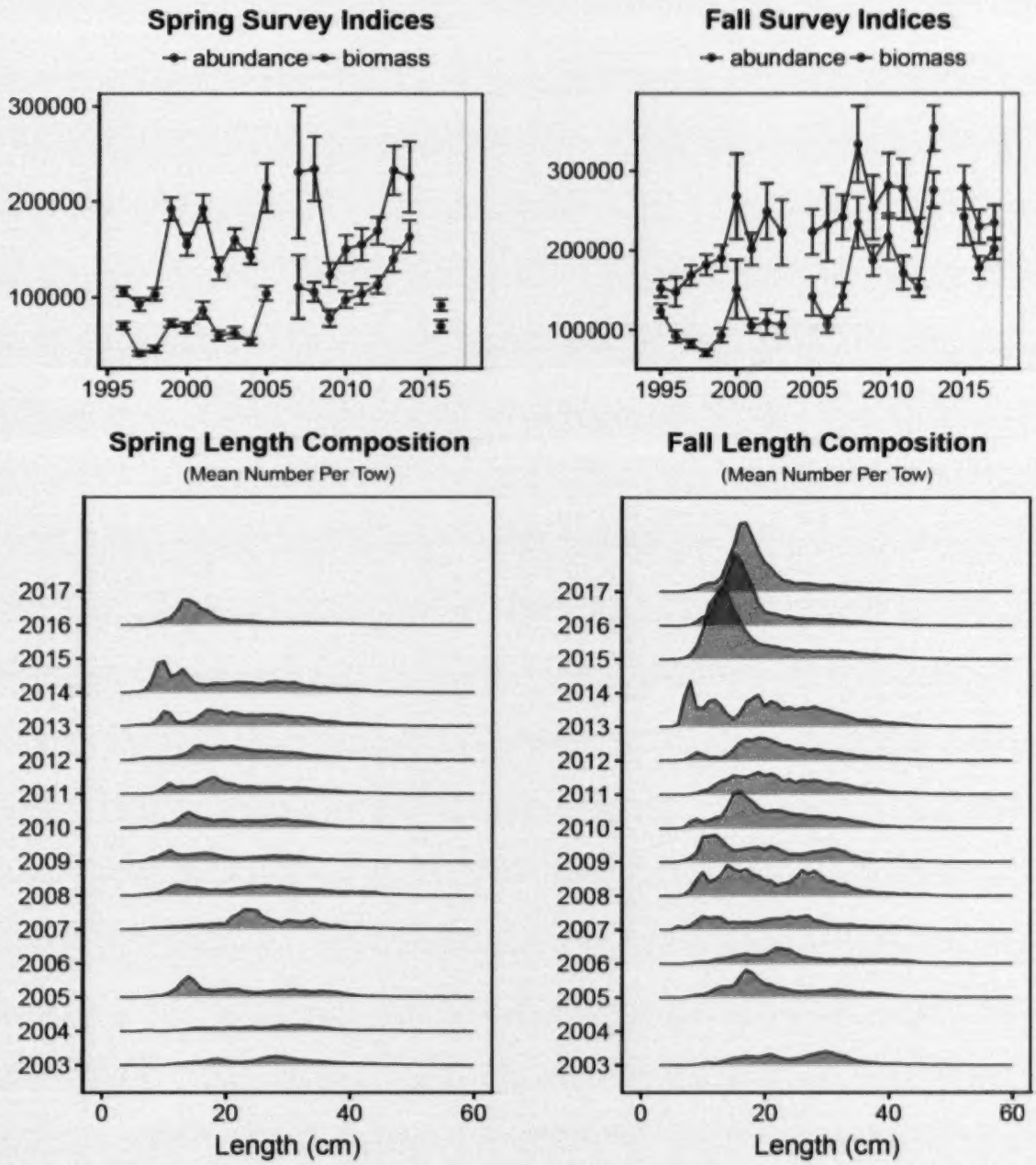


Figure 8. American Plaice (*Hippoglossoides platessoides*) in Divs. 3LNO. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed.

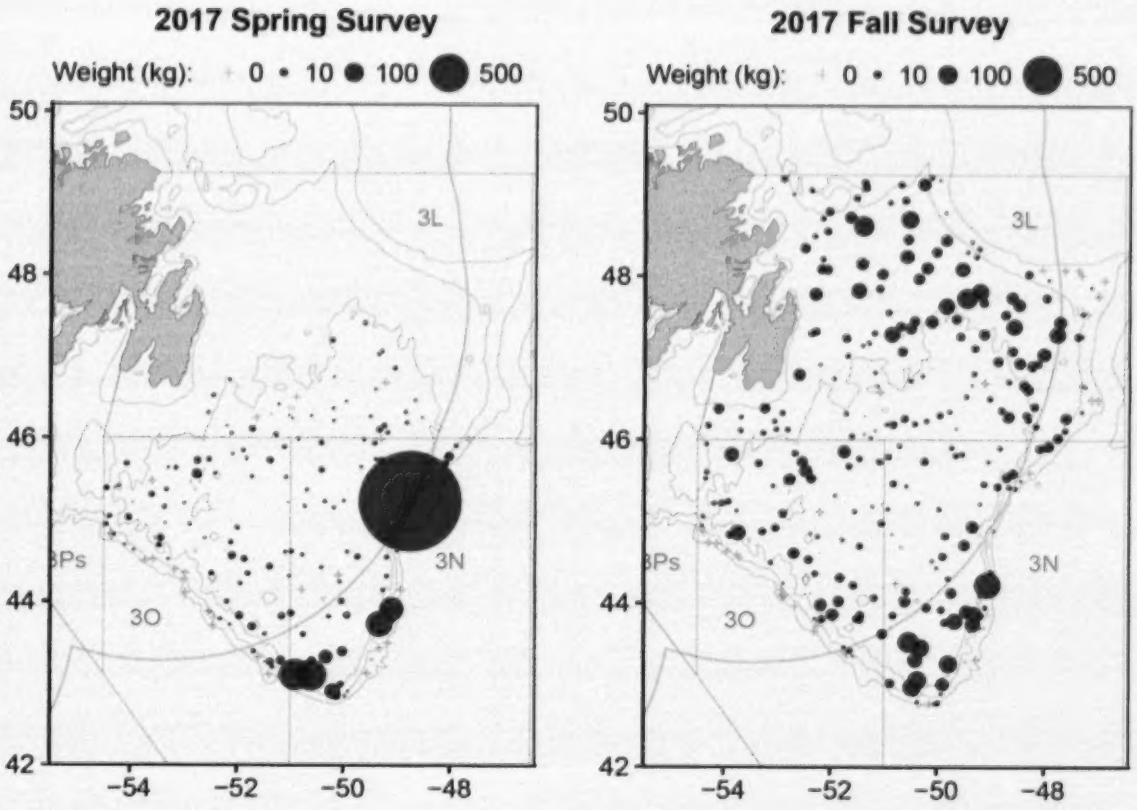


Figure 8. American Plaice (*Hippoglossoides platessoides*) in Divs. 3LNO (continued). Note that the 2017 spring survey was incomplete.

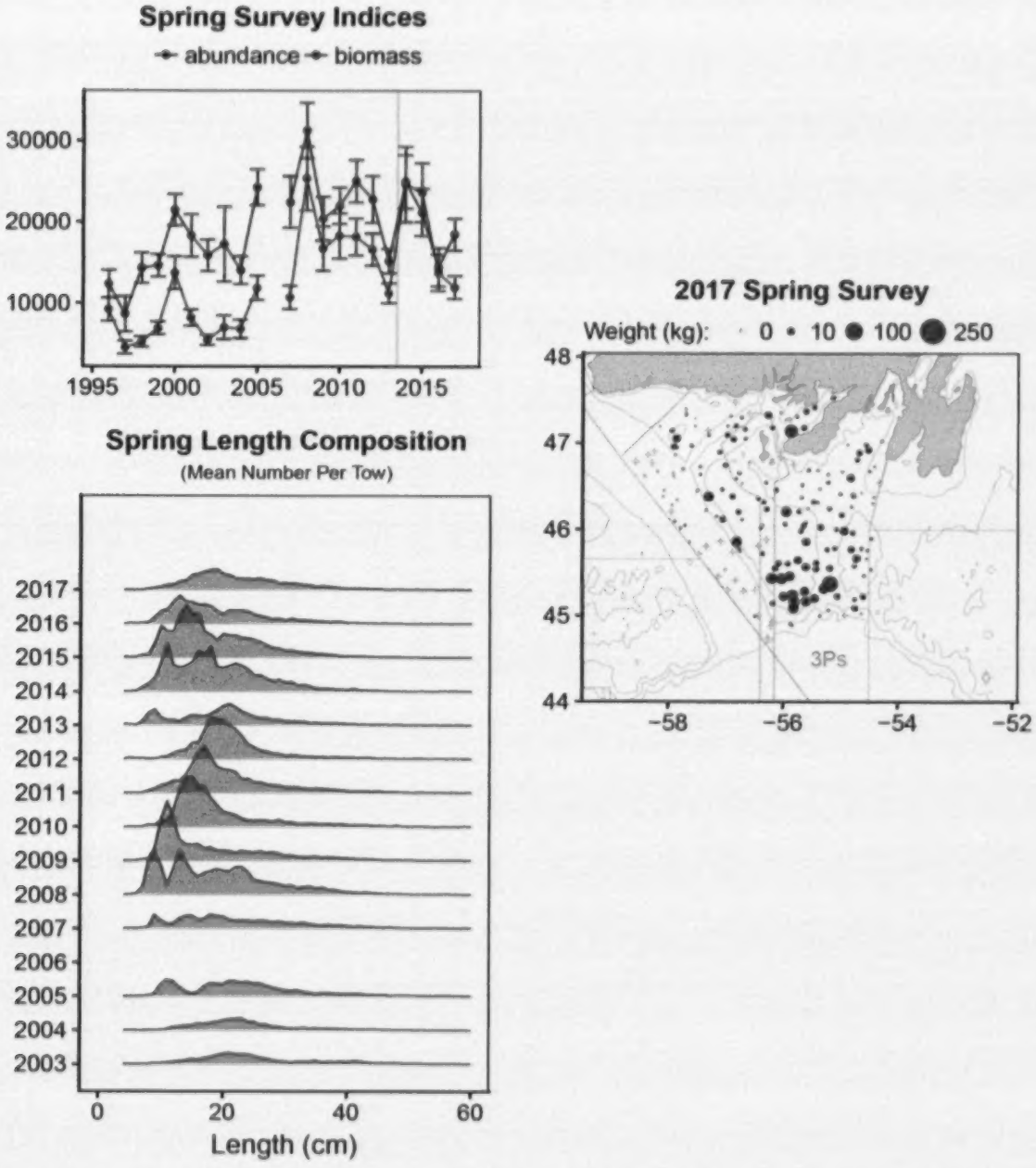


Figure 9. American Plaice (*Hippoglossoides platessoides*) in Subdiv. 3Ps. Data to the left of the vertical line were used in the most recent assessment of this stock. Any data to the right of the line have not been peer reviewed. Note that the autumn survey does not cover any portion of the stock area.

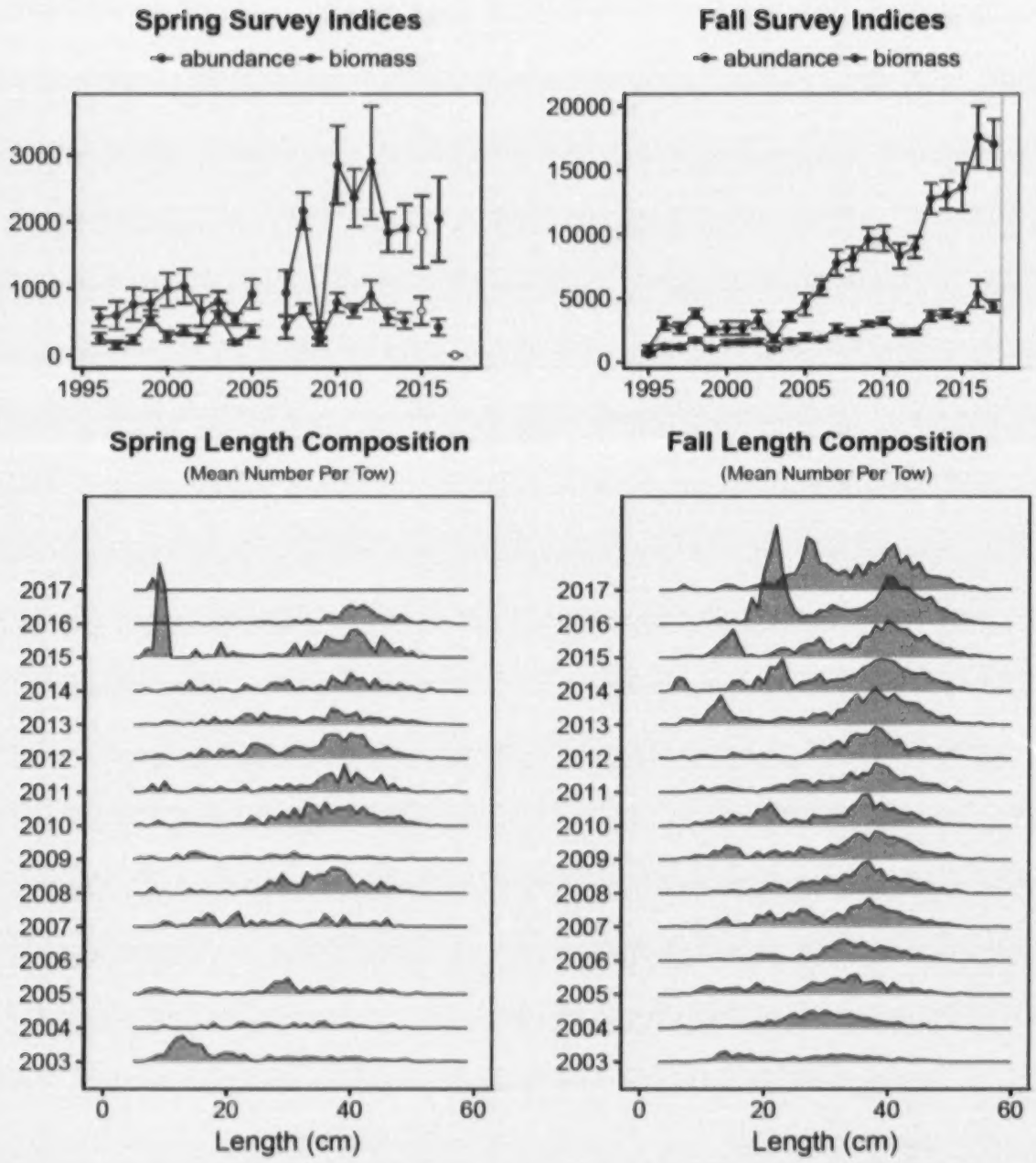


Figure 10. Witch Flounder (*Glyptocephalus cynoglossus*) in Divs. 2J3KL. Note that the spring survey covers Div. 3L, but not 2J3K, and is not currently used in the assessment of this stock. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Open symbols (above) and red frequencies (below) indicate questionable/potentially invalid data points due to survey coverage issues.

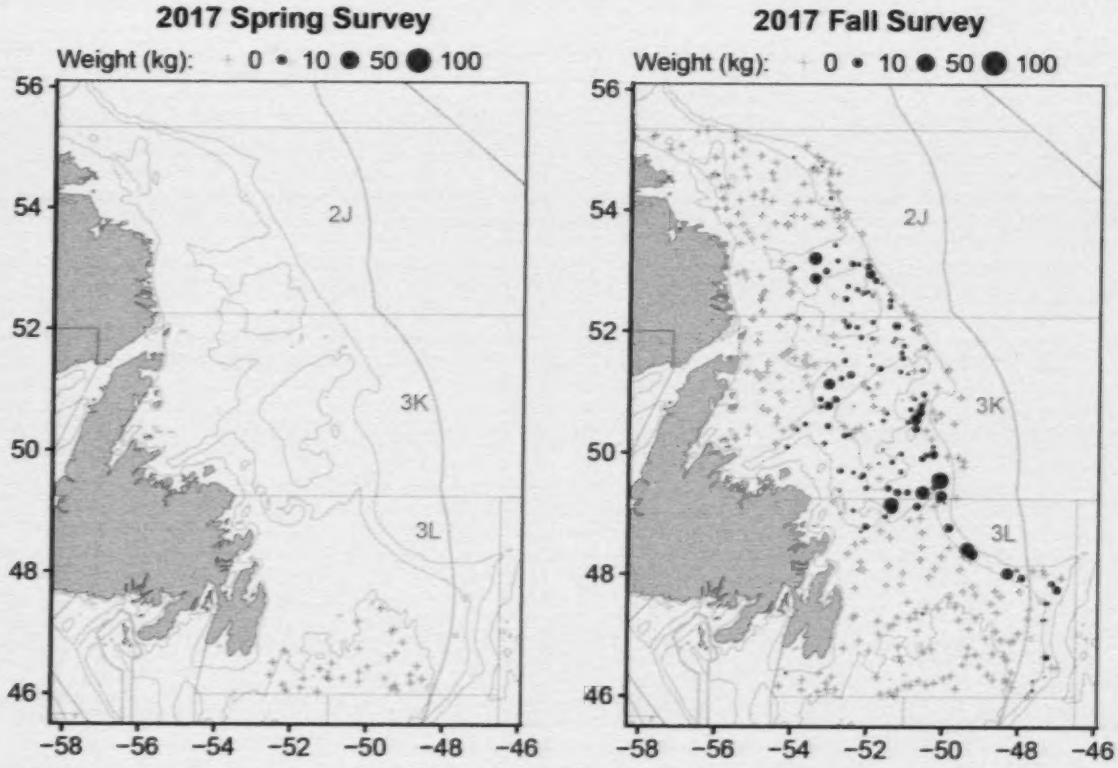


Figure 10. Witch Flounder (*Glyptocephalus cynoglossus*) in Divs. 2J3KL (continued). Summary of survey information for Witch Flounder in Divs. 2J3KL.

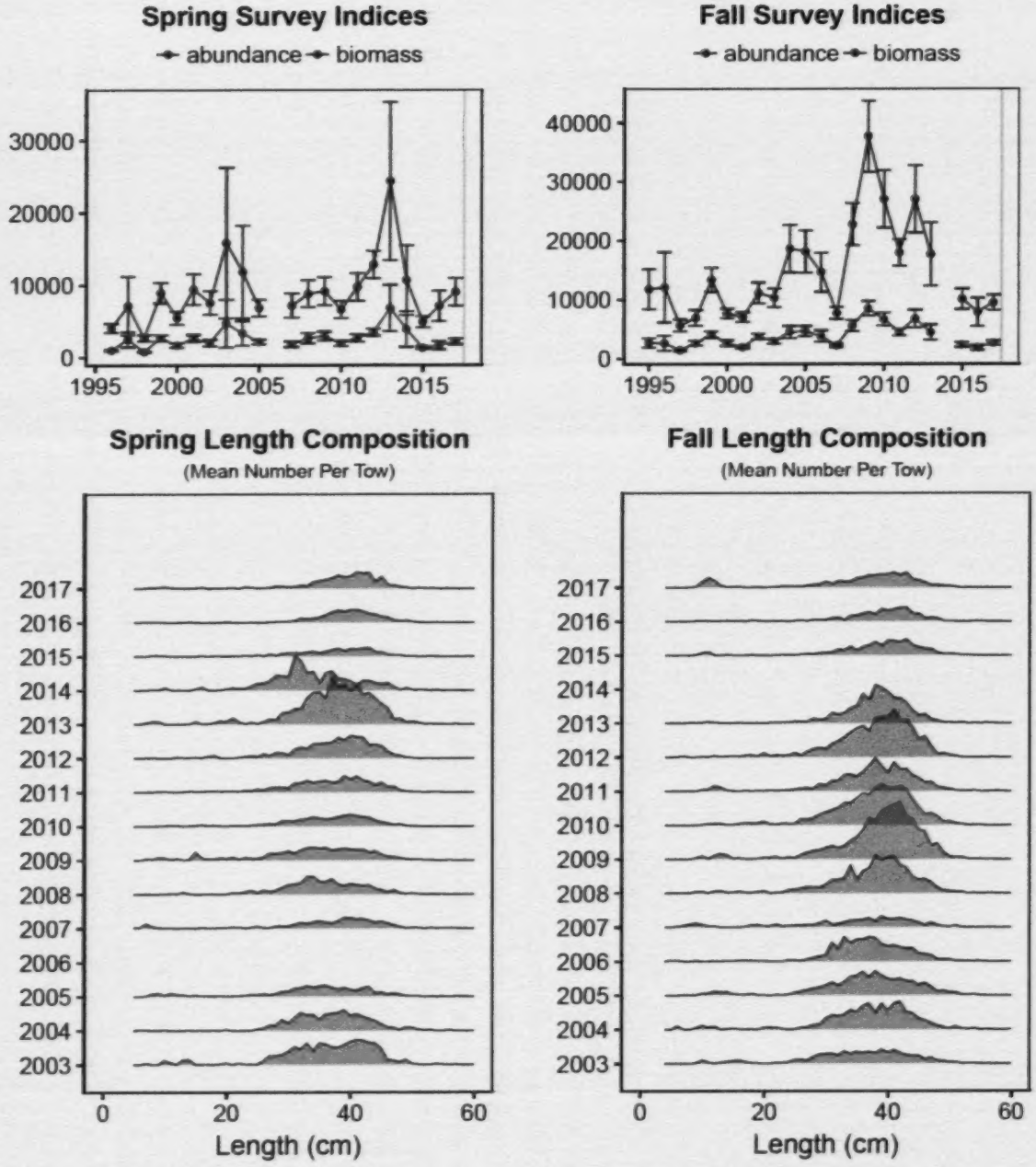


Figure 11. Witch Flounder (*Glyptocephalus cynoglossus*) in Divs. 3NO. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed.

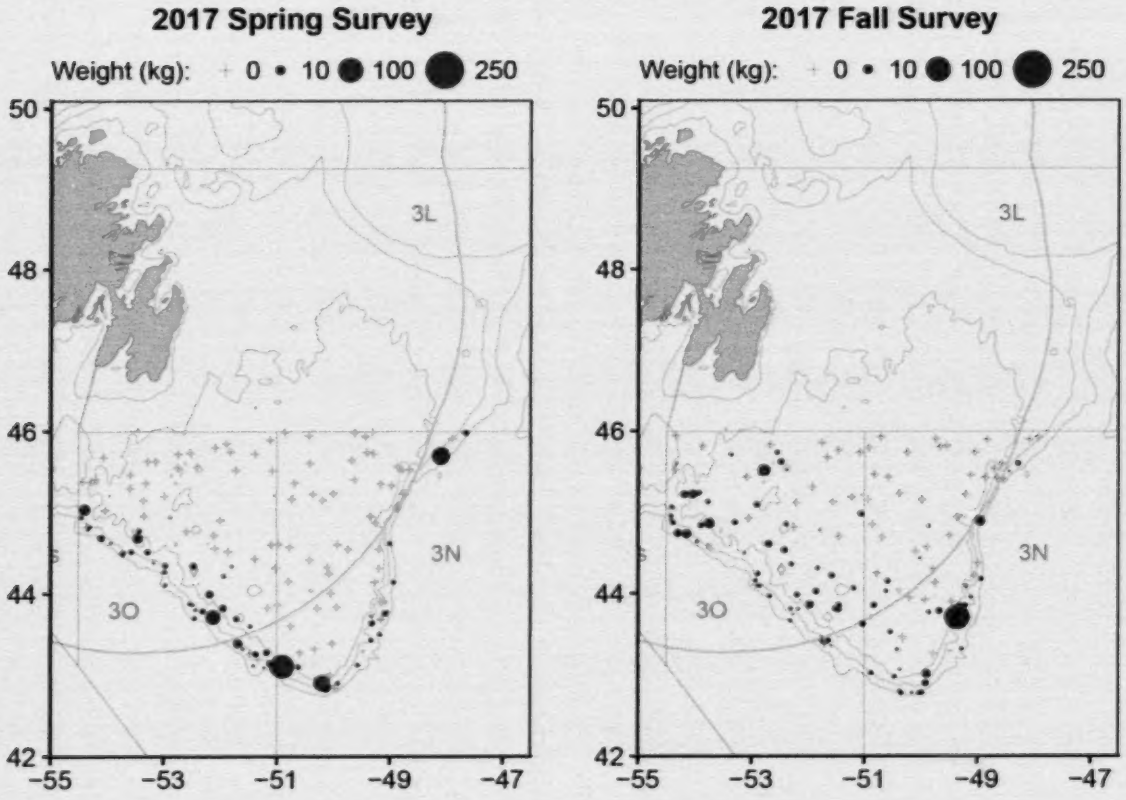


Figure 11. Witch Flounder (*Glyptocephalus cynoglossus*) in Divs. 3NO (continued).

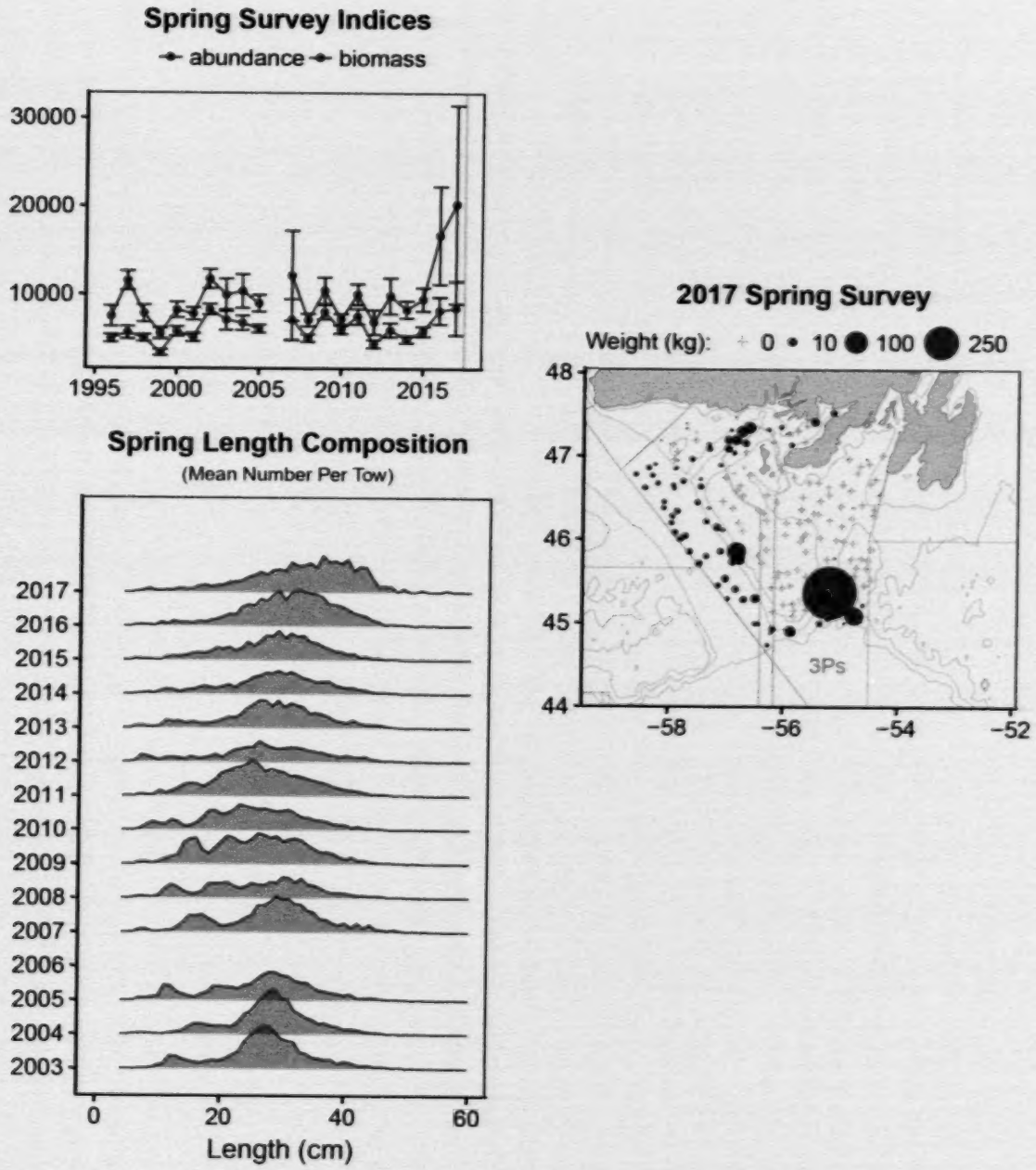


Figure 12. Witch Flounder (*Glyptocephalus cynoglossus*) in Subdiv. 3Ps. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Note that the autumn survey does not cover any portion of the stock area.

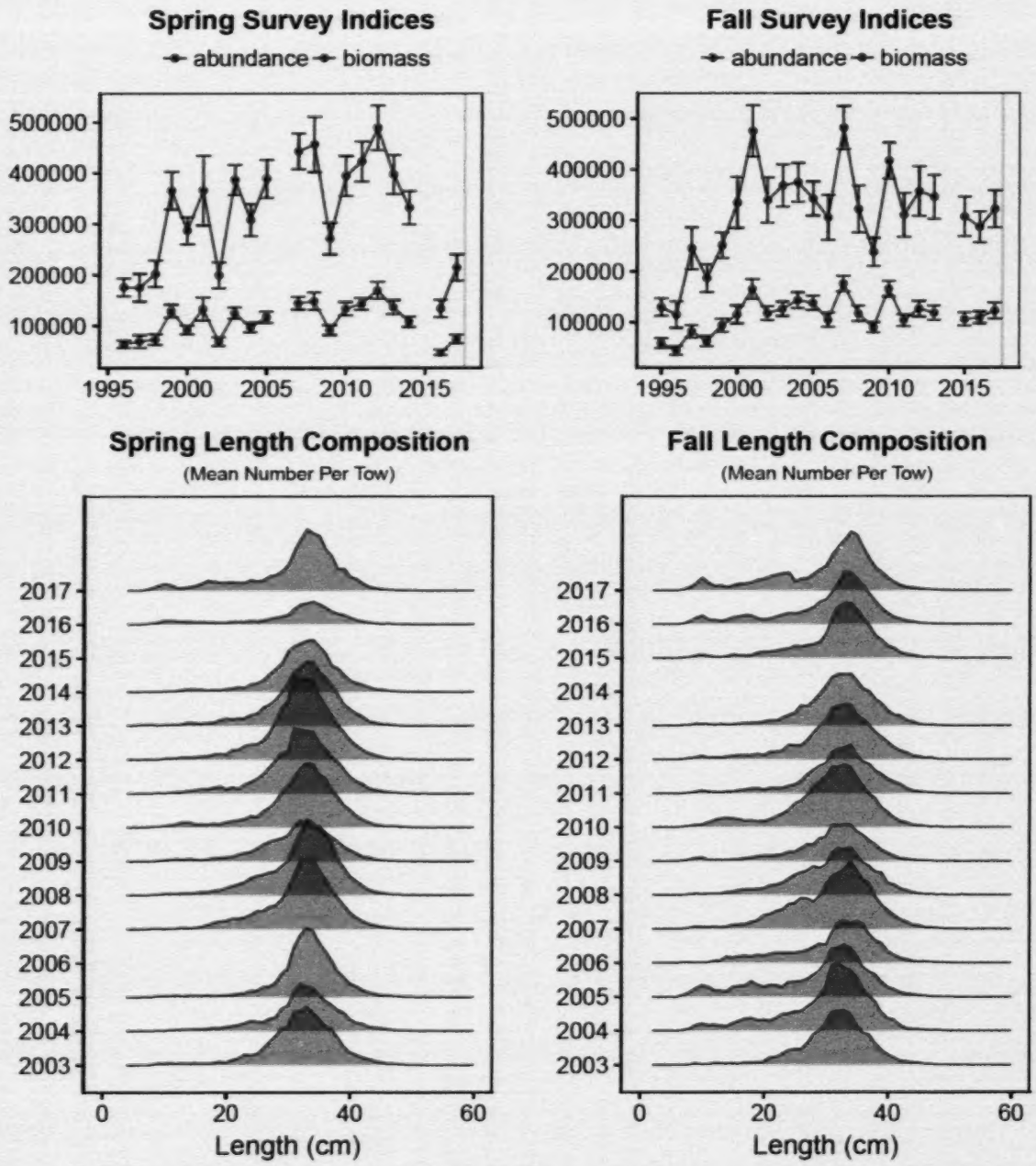


Figure 13. Yellowtail Flounder (*Limanda ferruginea*) in Divs. 3LNO. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed.

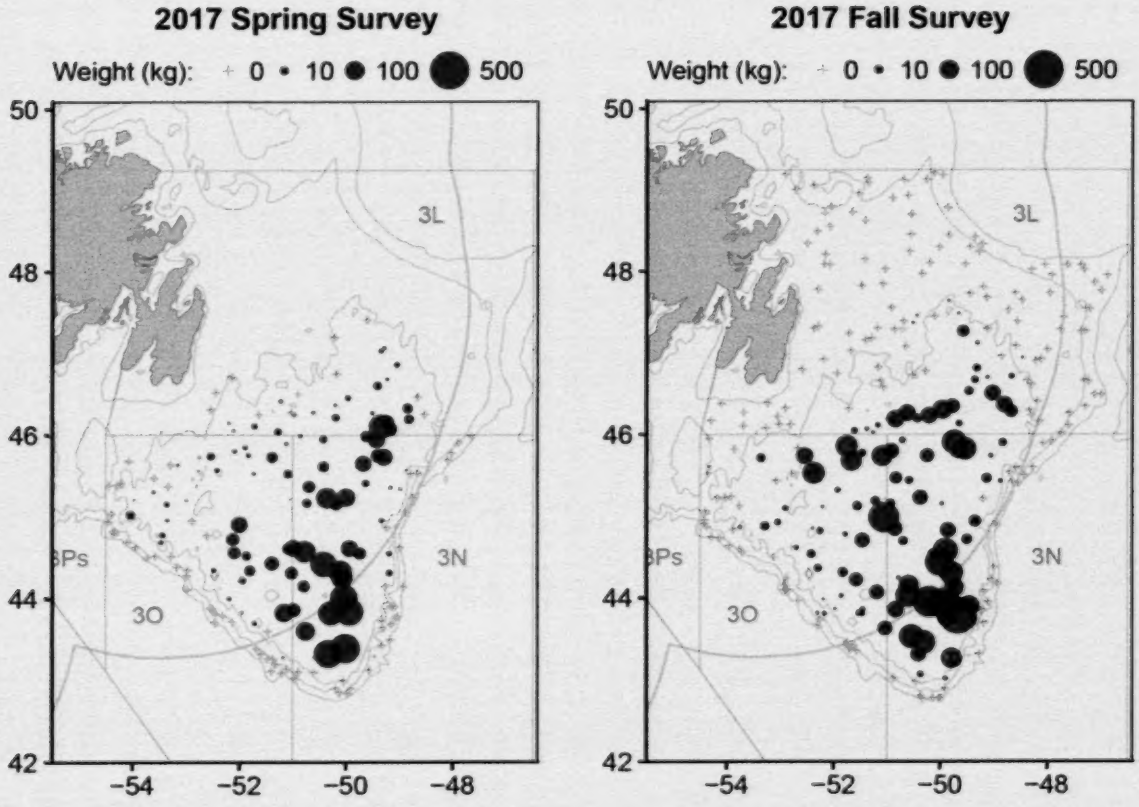


Figure 13. Yellowtail Flounder (*Limanda ferruginea*) in Divs. 3LNO (continued).

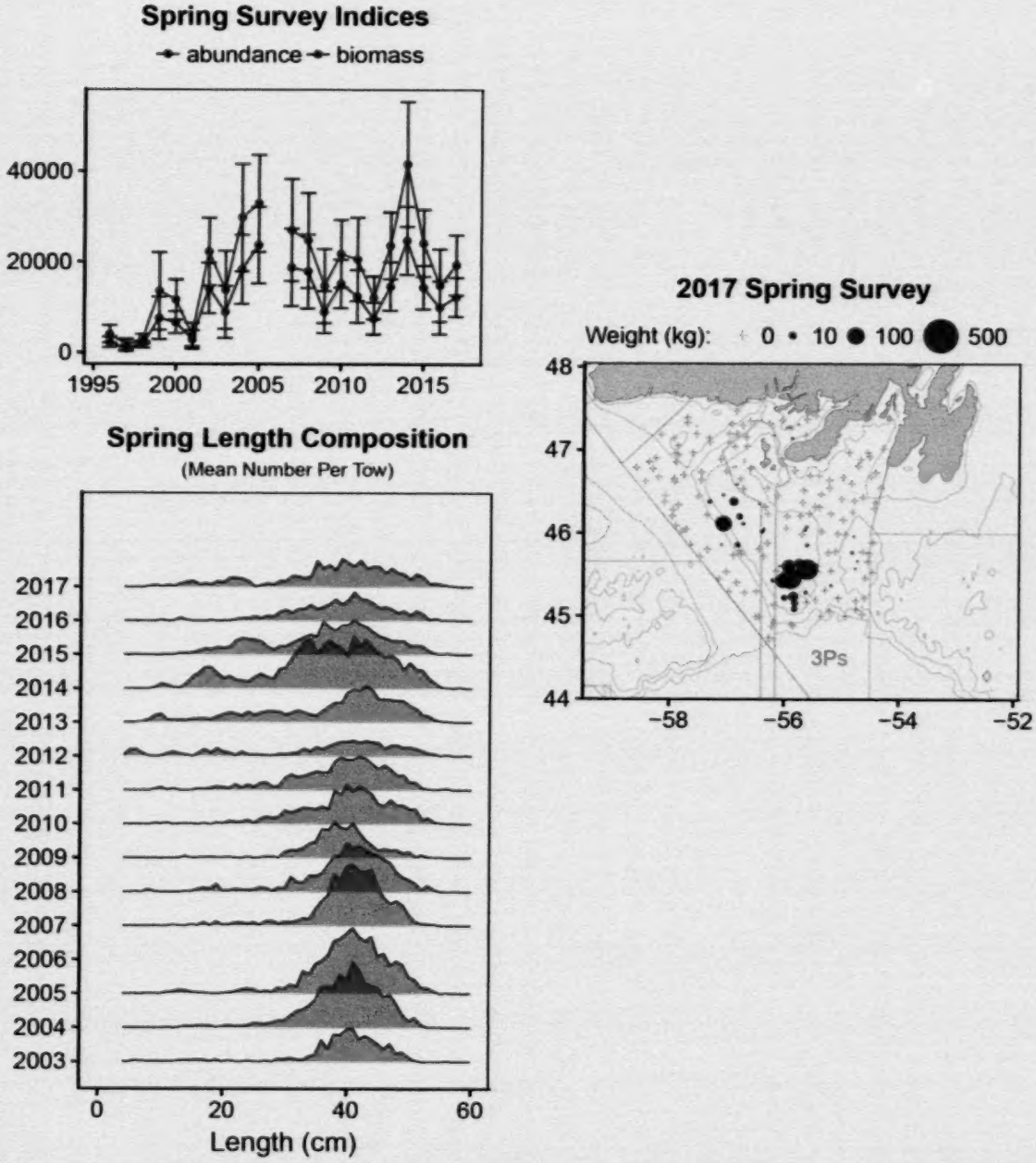


Figure 14. Yellowtail Flounder (*Limanda ferruginea*) in Subdiv. 3Ps. The status of this stock has never been assessed. Note that the autumn survey does not cover any portion of this stock area.

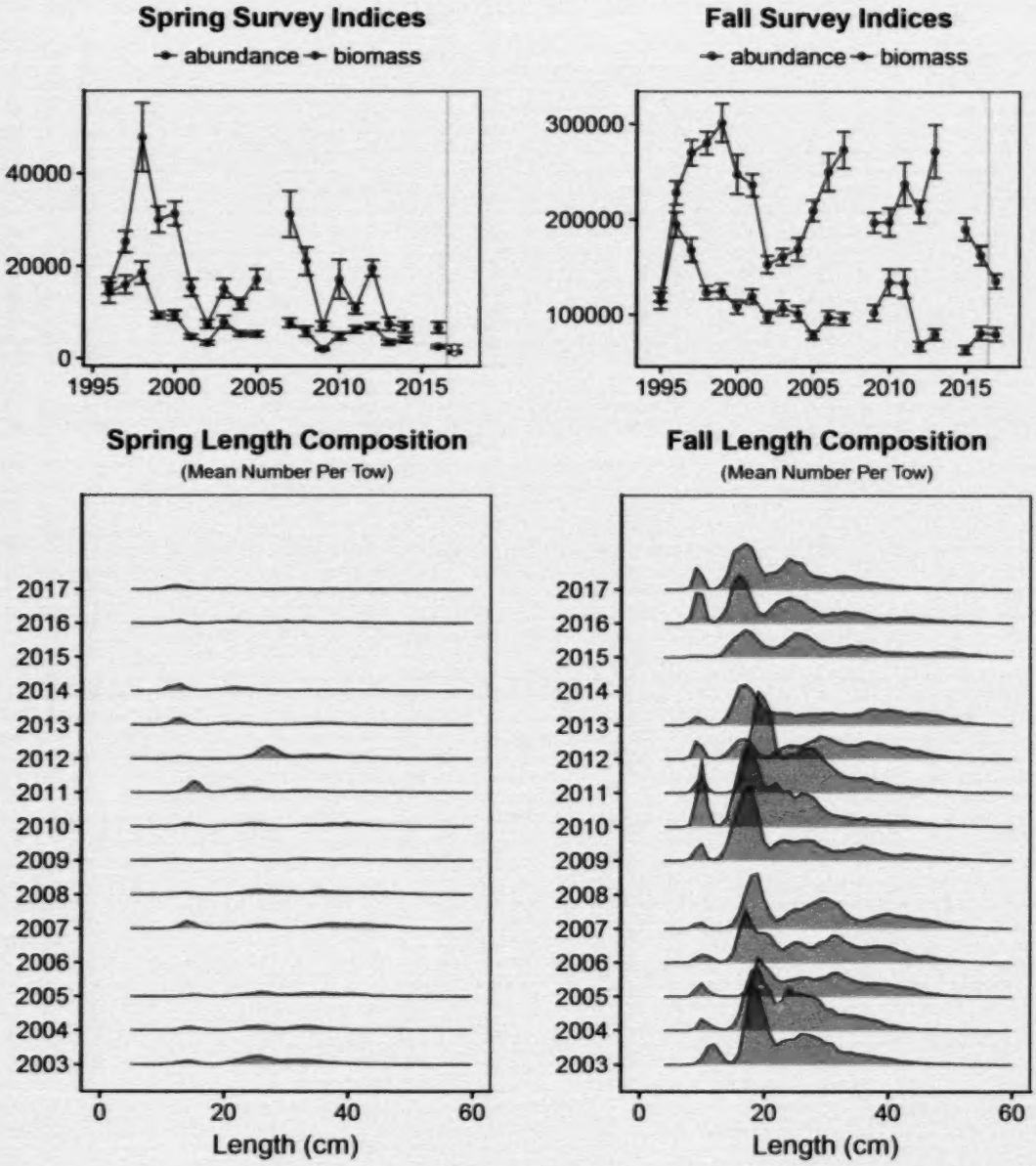


Figure 15. Greenland Halibut (*Reinhardtius hippoglossoides*) in SA2+Divs. 3KLMNO. Spring indices and length frequencies include data for Divs. 3LNO and those for fall include data for Divs. 2J3KLNO (2H has been excluded). Note that the current assessment for this stock splits the autumn survey indices into a series for Divs. 2J3K and a series for Divs. 3LNO. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Open symbols (above) and red frequencies (below) indicate questionable/potentially invalid data points due to survey coverage issues.

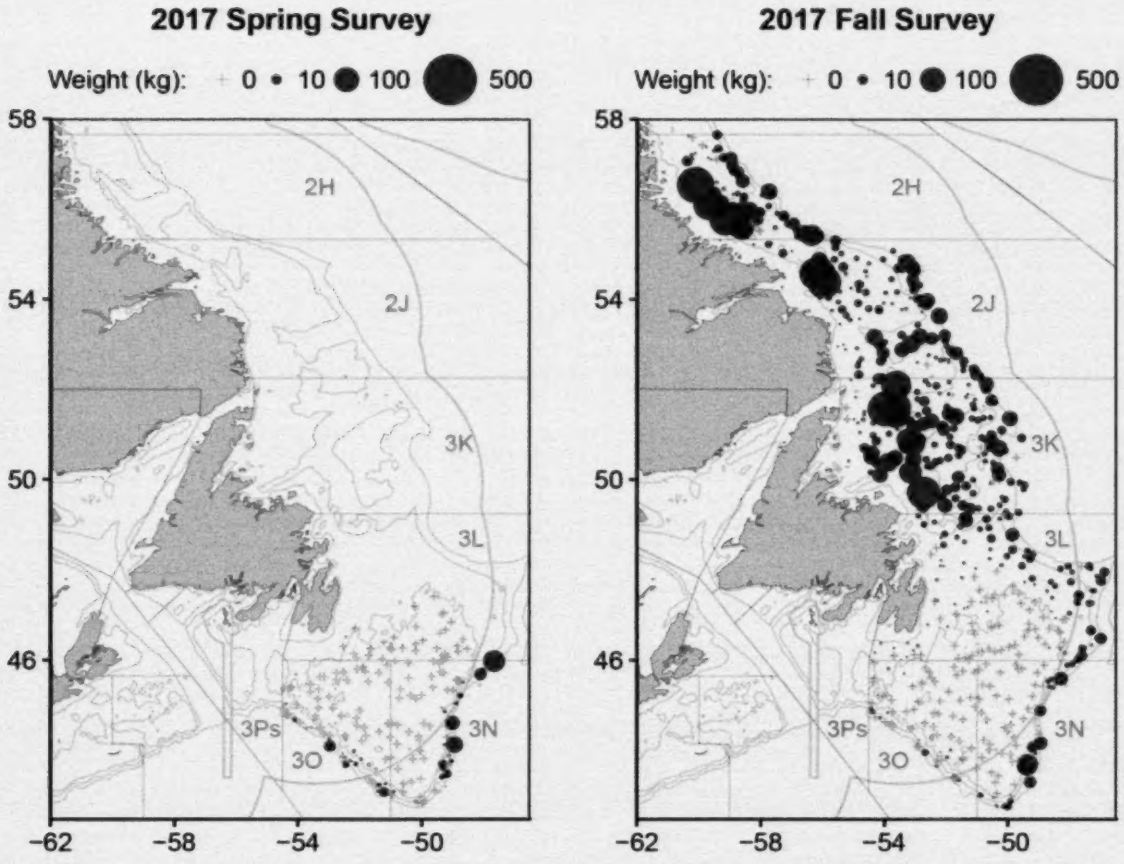


Figure 15. Greenland Halibut (*Reinhardtius hippoglossoides*) in SA2 + Divs. 3KLMNO (continued).

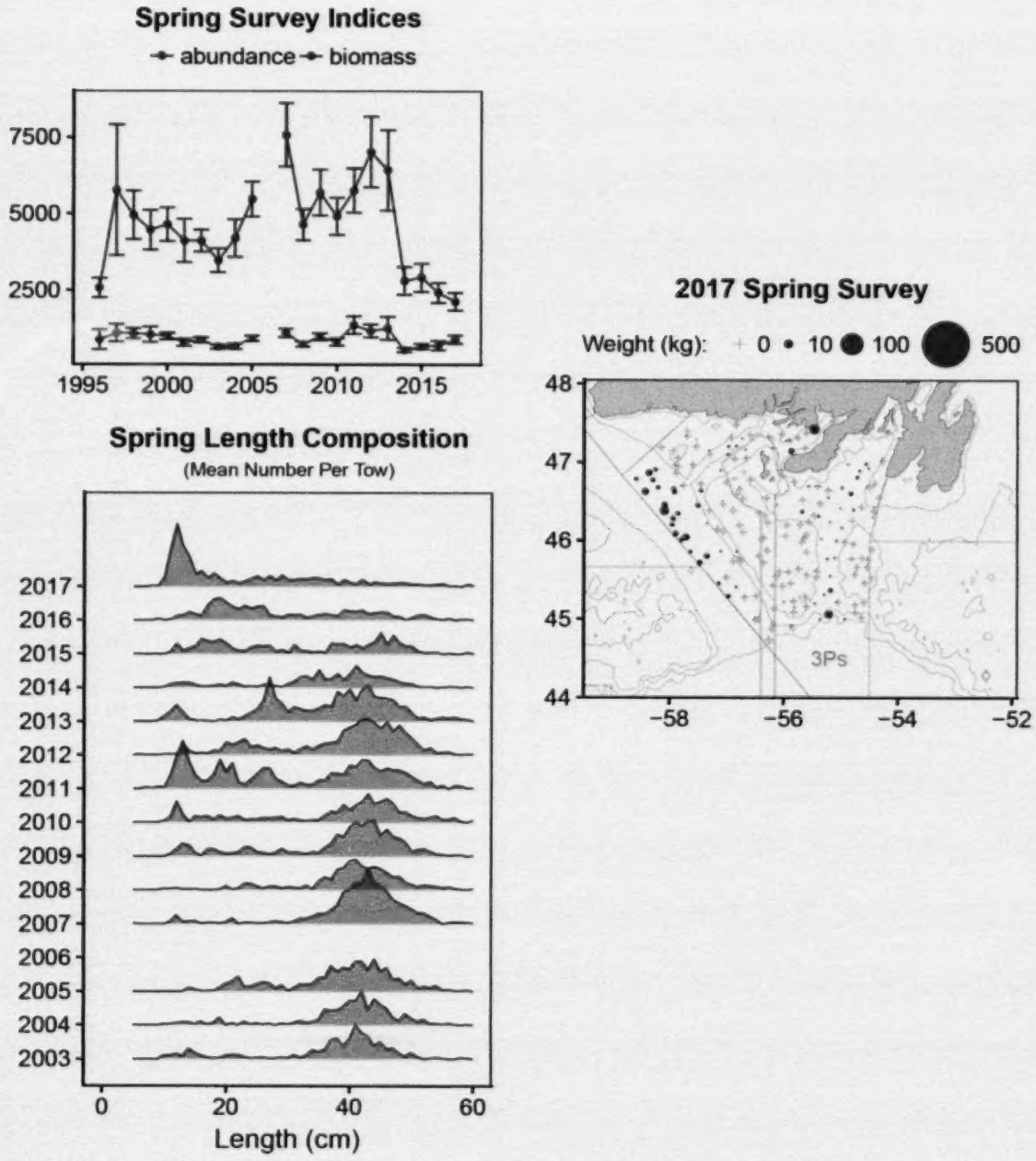


Figure 16. Greenland Halibut (*Reinhardtius hippoglossoides*) in Subdiv. 3Ps. The status of this stock has not been assessed. Note that the autumn survey does not cover any portion of this stock area.

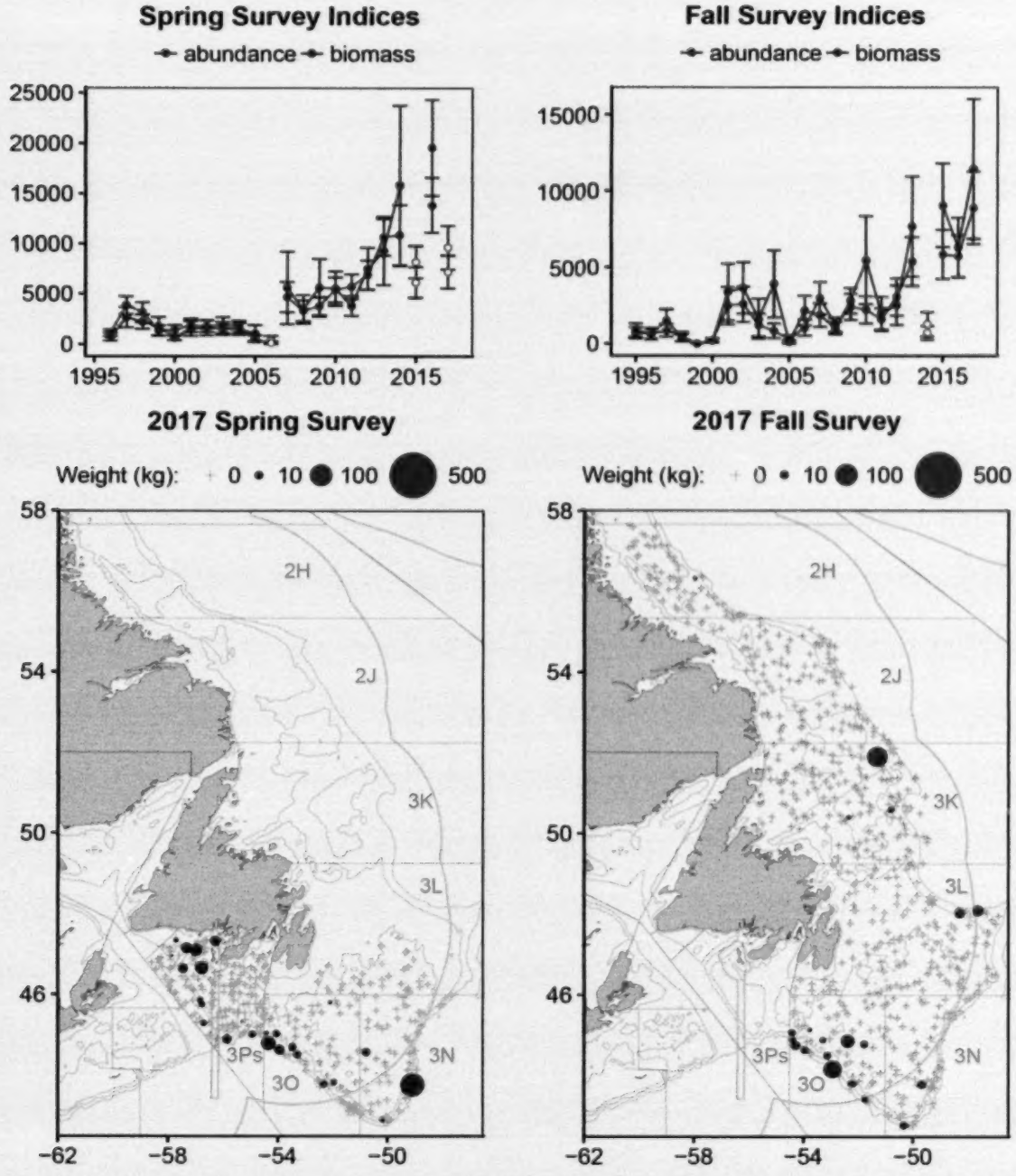


Figure 17. Atlantic Halibut (*Hippoglossus hippoglossus*) in SA 2+3. Spring indices include data for Divs. 3LNOPs and those for fall include data for Divs. 2J3KLNO (2H has been excluded). Note that the current assessment for this stock uses data from an industry longline survey of Divs. 3NOPs rather than the RV survey data presented here. Open symbols (above) and red frequencies (below) indicate questionable/potentially invalid data points due to survey coverage issues.

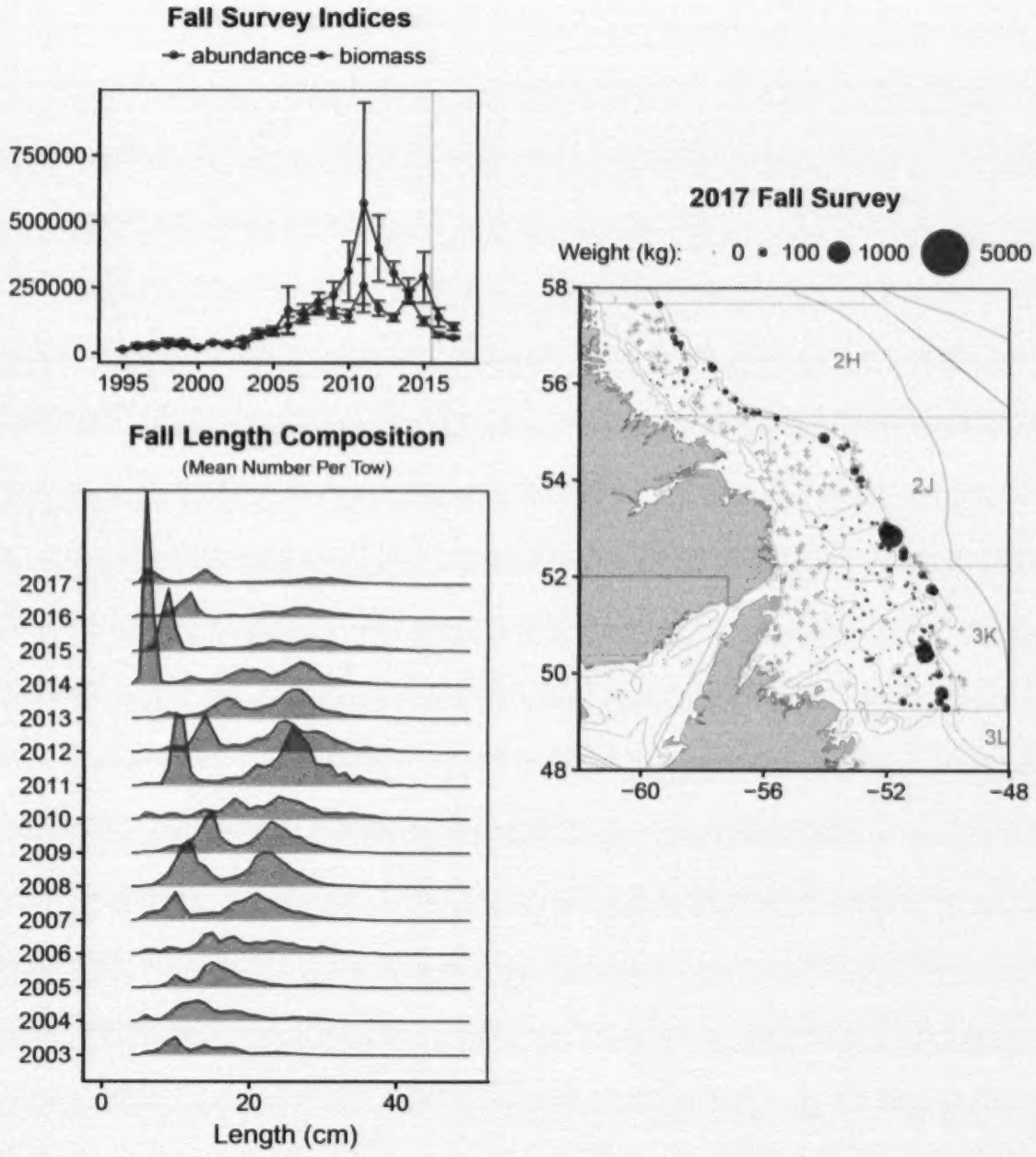


Figure 18. Beaked Redfish (*Sebastes fasciatus* & *Sebastes mentella*) in SA2 + Div. 3K. Note that only data for Divs. 2J3KL are included in the index and length frequency plots. Data to the left of the vertical line were used in the most recent assessment of this stock. Any data to the right of the line have not been peer reviewed. Note that the spring survey does not cover any portion of the stock area.

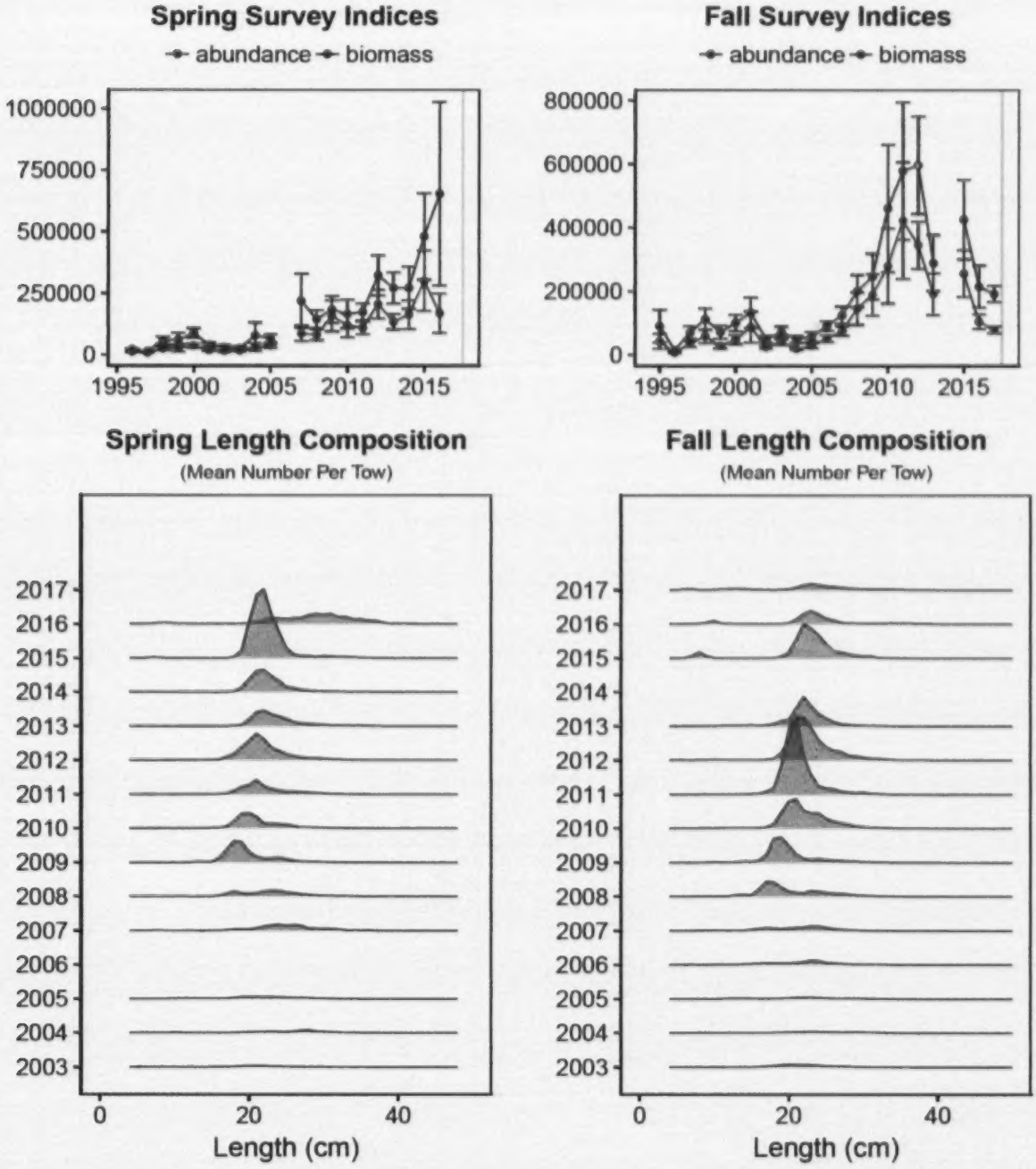


Figure 19. Beaked Redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Divs. 3LN. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Open symbols (above) and red frequencies (below) indicate questionable/potentially invalid data points due to survey coverage issues.

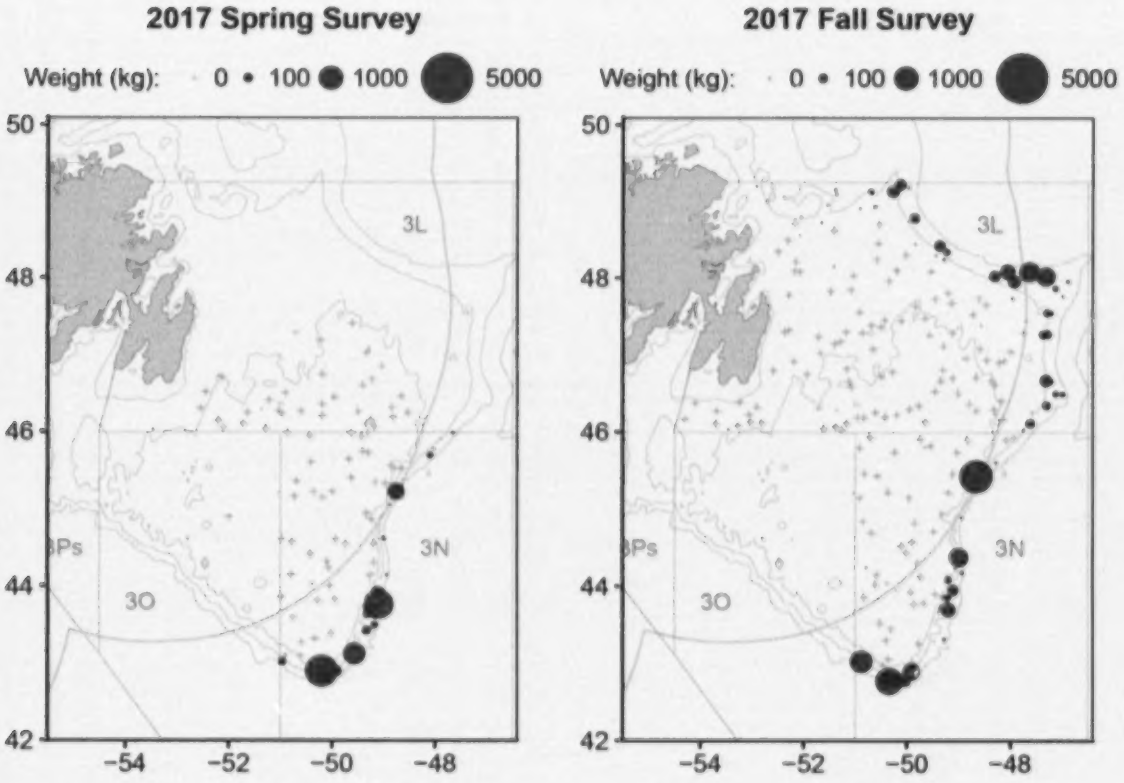


Figure 19. Beaked Redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Divs. 3LN (continued).

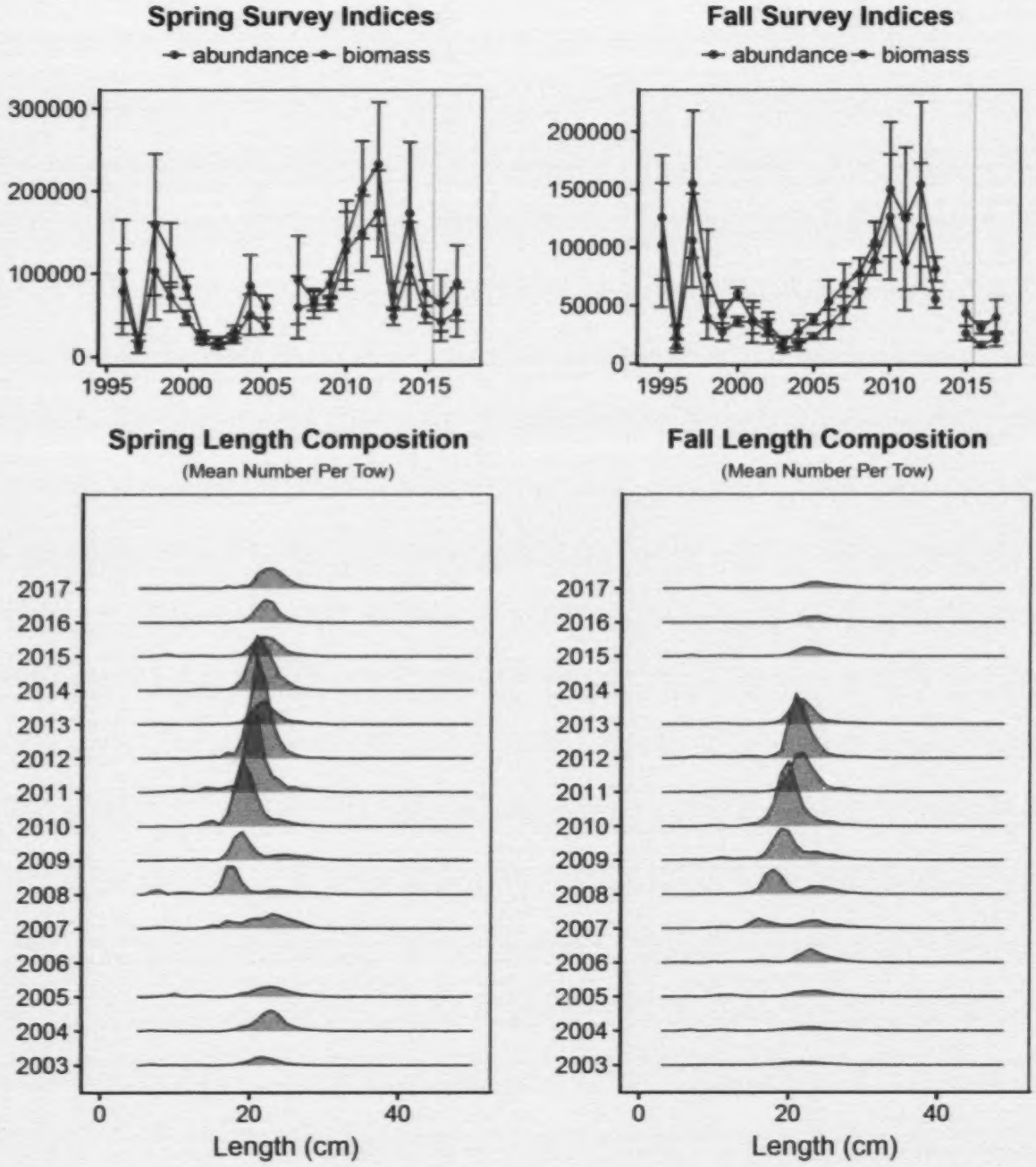


Figure 20. Beaked Redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Div. 3O. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed.

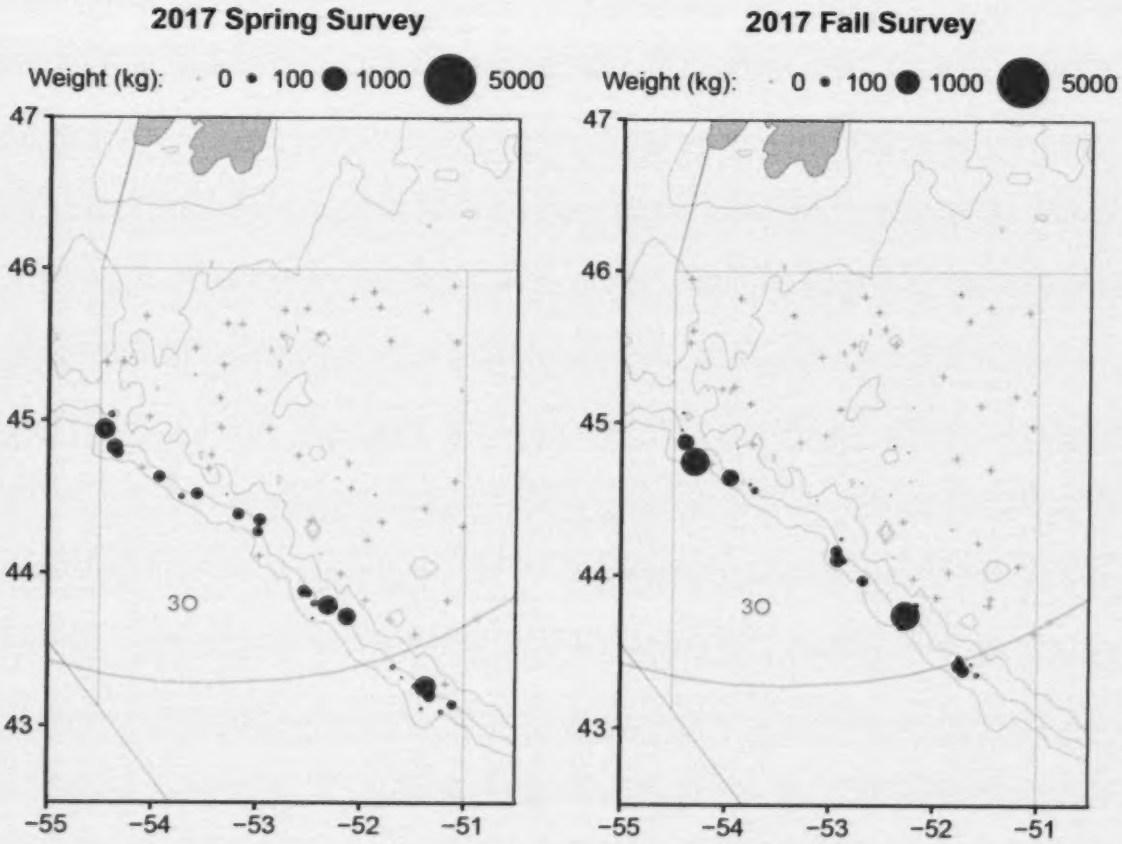


Figure 20. Beaked Redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Div. 3O (continued).

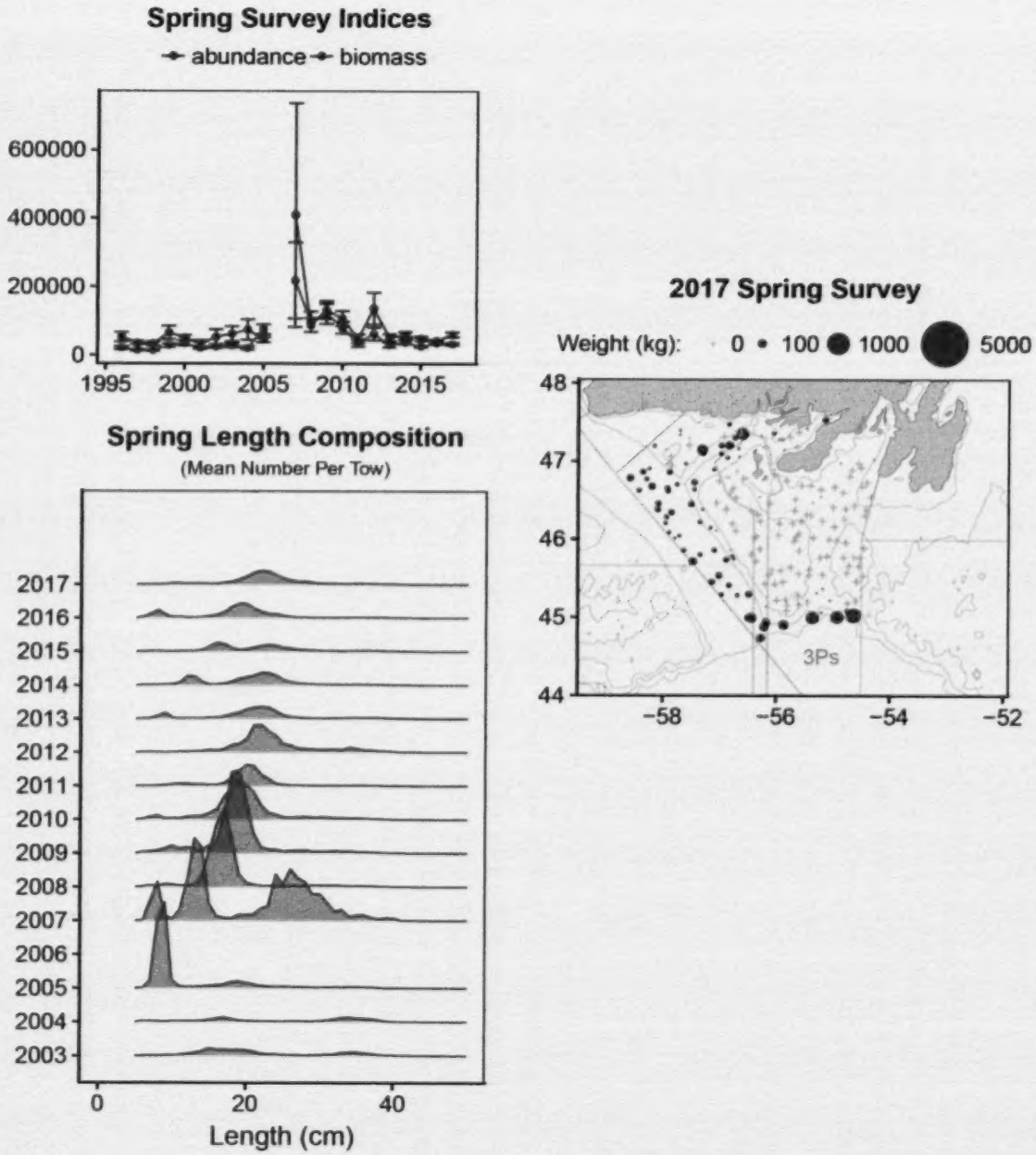
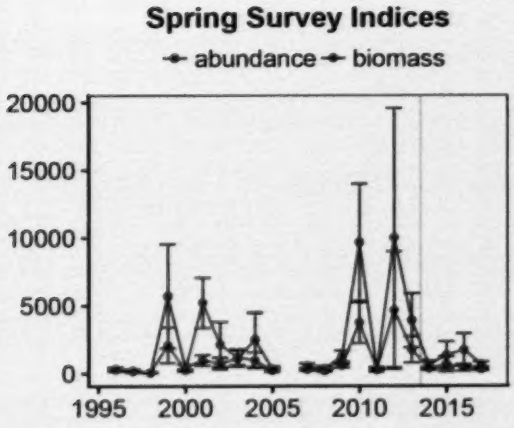
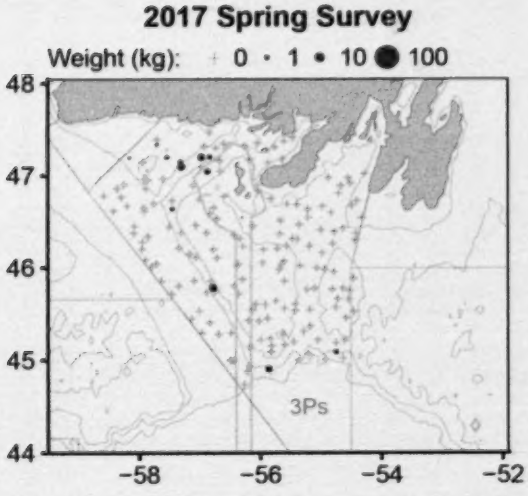


Figure 21. Beaked Redfish (*Sebastes fasciatus* & *Sebastes mentella*) in Subdiv. 3Ps. Note that redfish in this area are managed as part of a larger stock area (Unit 2) and the assessment is based on a DFO-Industry survey rather than these RV survey data. The autumn RV survey does not cover any portion of the stock area.





Note
Spring length frequency data have not been archived for this species/stock

Figure 22. Pollock (*Pollachius virens*) in Subdiv. 3Ps. Data to the left of the vertical line were used in the most recent assessment of this stock. Any data to the right of the line have not been peer reviewed. Note that length frequency data for this species have not been archived since 2011. The autumn survey does not cover any portion of the stock area.

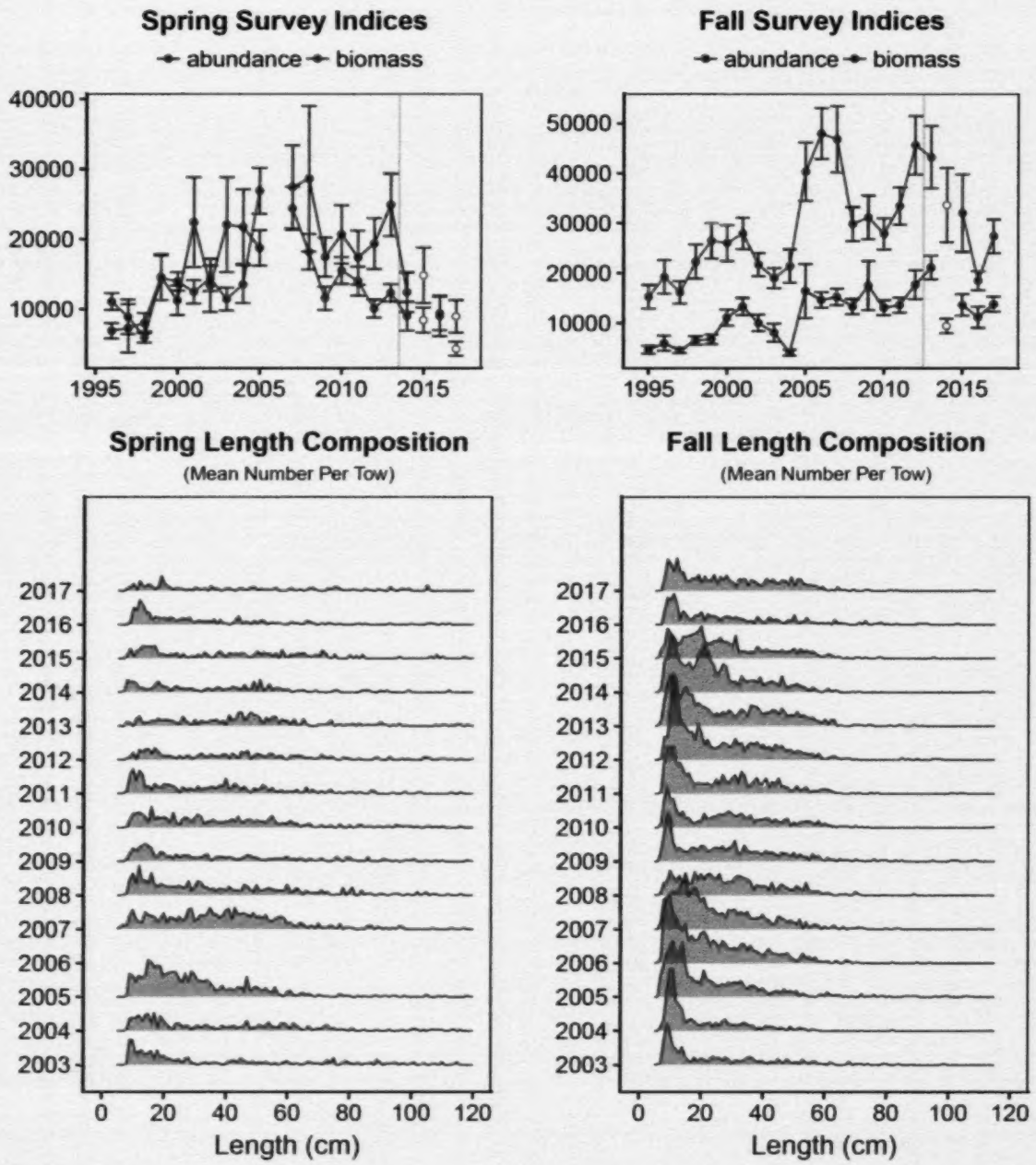


Figure 23. Striped Wolffish (*Anarhichas lupus*) in SA2+3. Spring indices and length frequencies include data for Divs. 3LNOPs and those for fall include data for Divs. 2J3KLNO (2H has been excluded). Note that the most recent assessment of this species examined survey indices separately for Divs. 2J3K, 3LNO, and 3Ps. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Open symbols (above) and red frequencies (below) indicate questionable/potentially invalid data points due to survey coverage issues.

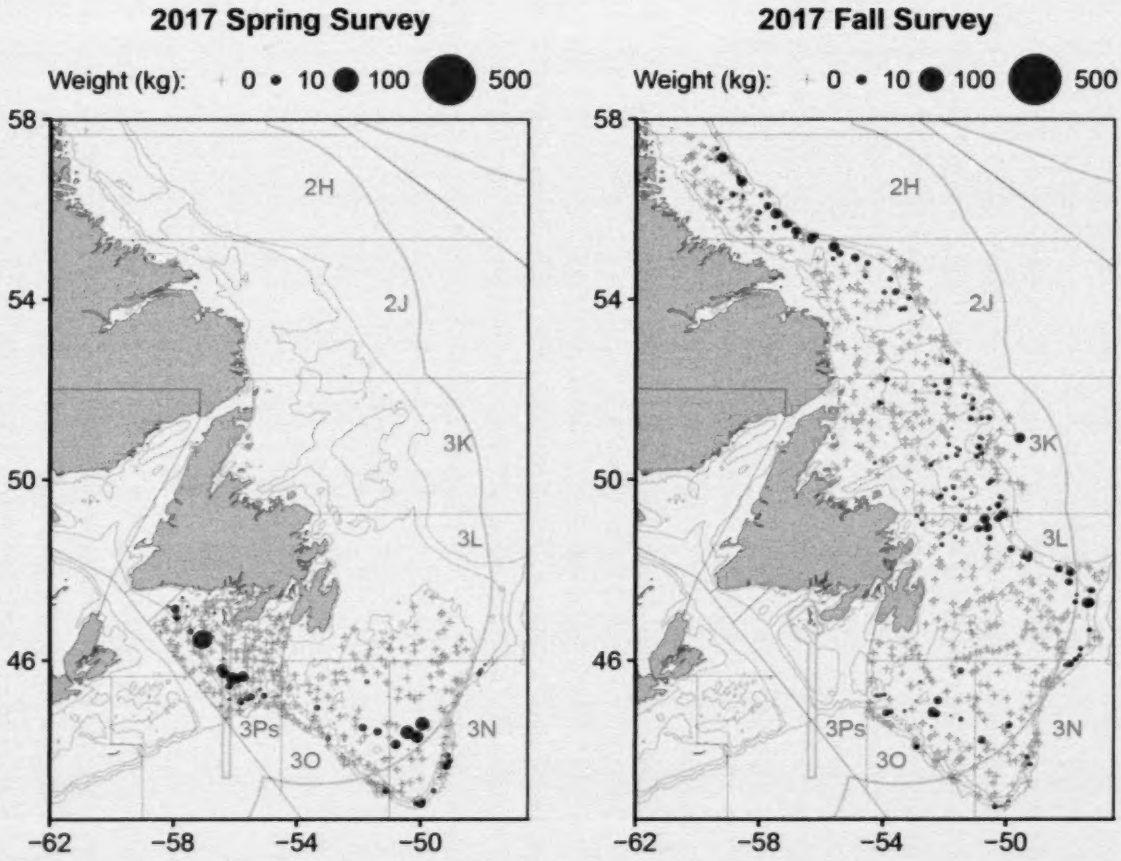


Figure 23. Striped Wolffish (*Anarhichas lupus*) in SA2+3 (continued).

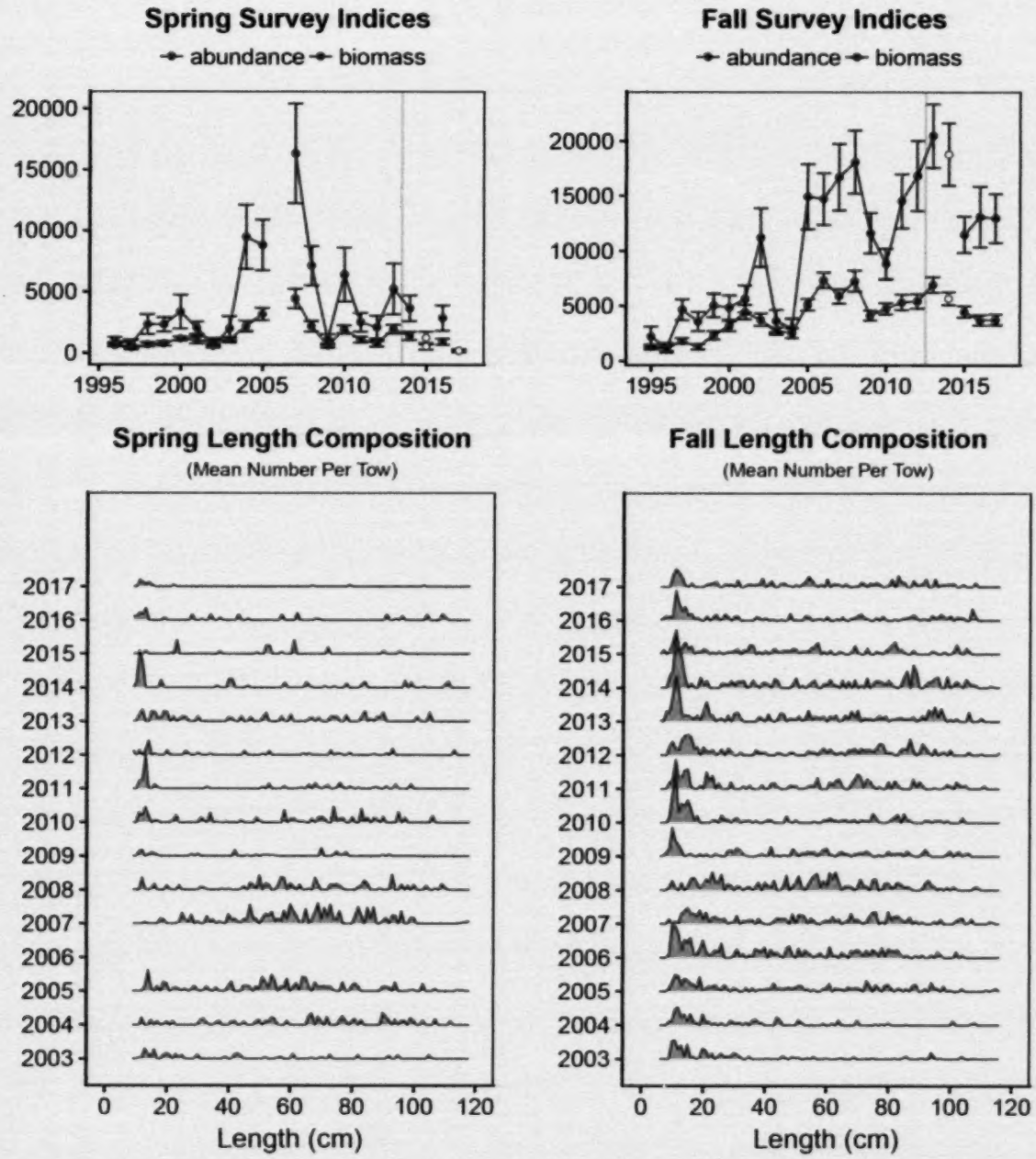


Figure 24. Spotted Wolffish (*Anarhichas minor*) in SA2+3. Spring indices and length frequencies include data for Divs. 3LNOPs and those for fall include data for Divs. 2J3KLNO (2H has been excluded). Note that the most recent assessment of this species examined survey indices separately for Divs. 2J3K, 3LNO, and 3Ps. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Open symbols (above) and red frequencies (below) indicate questionable/potentially invalid data points due to survey coverage issues.

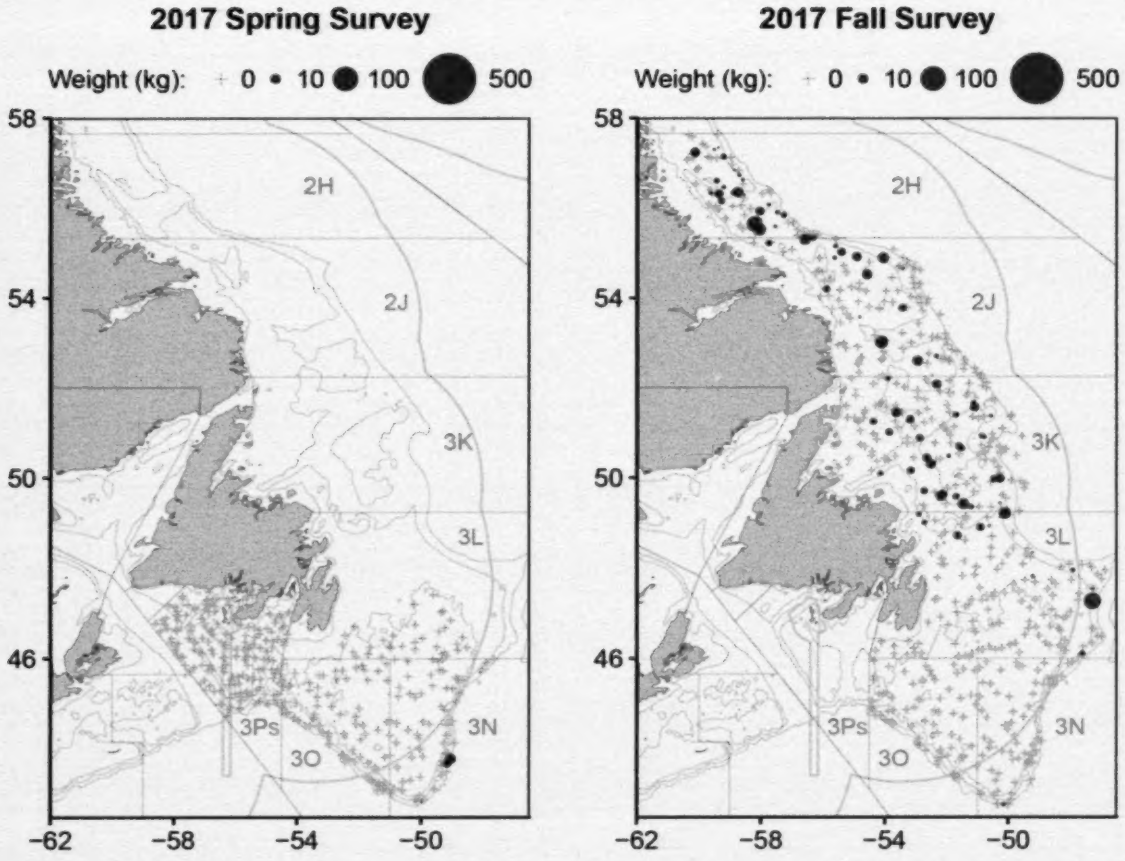


Figure 24. Spotted Wolffish (*Anarhichas minor*) in SA2+3 (continued).

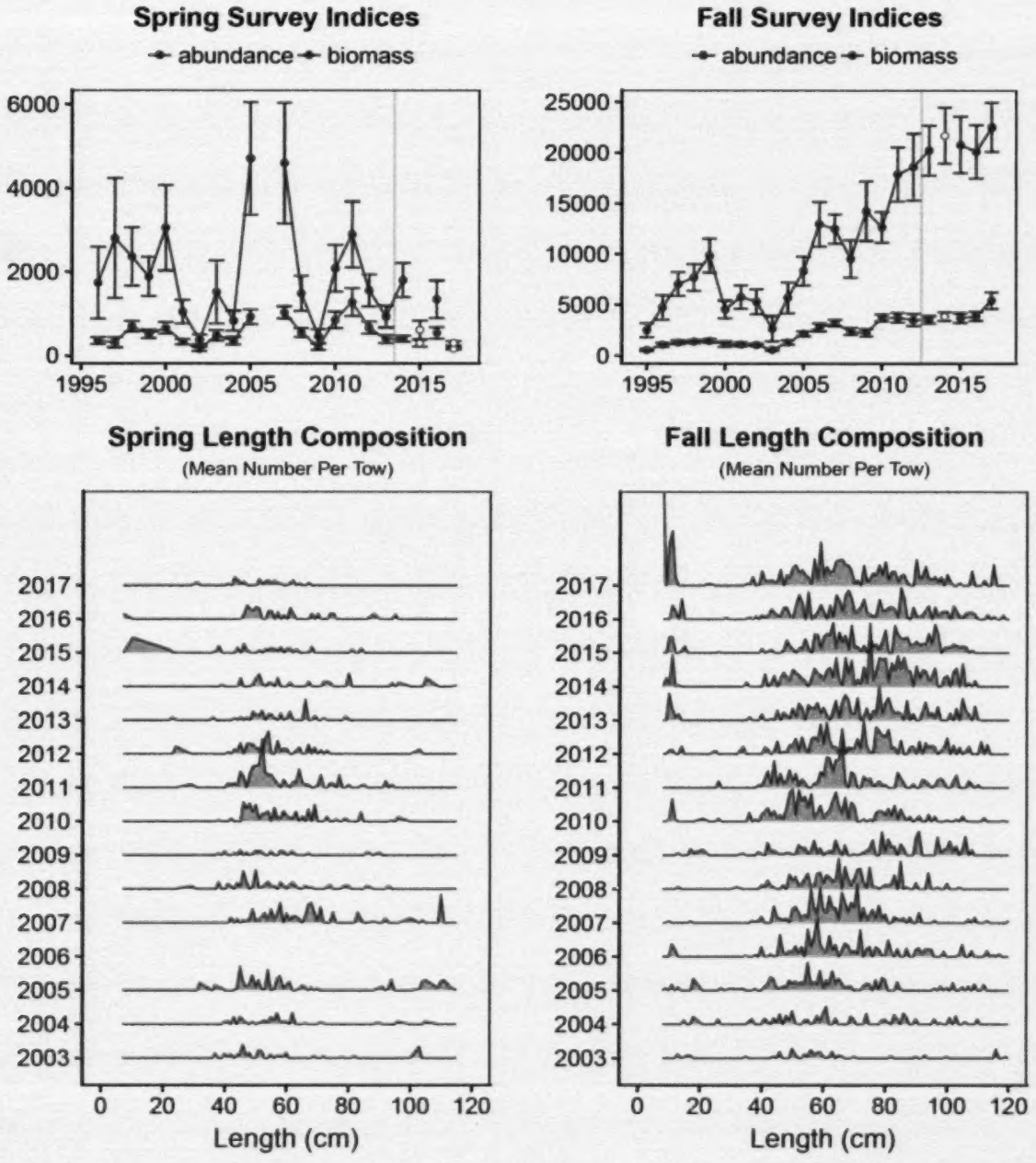


Figure 25. Broadhead Wolffish (*Anarhichas denticulatus*) in SA2+3. Spring indices and length frequencies include data for Divs. 3LNOPs and those for fall include data for Divs. 2J3KLNO (2H has been excluded). Note that the most recent assessment of this species examined survey indices separately for Divs. 2J3K, 3LNO, and 3Ps. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Open symbols (above) and red frequencies (below) indicate questionable/potentially invalid data points due to survey coverage issues.

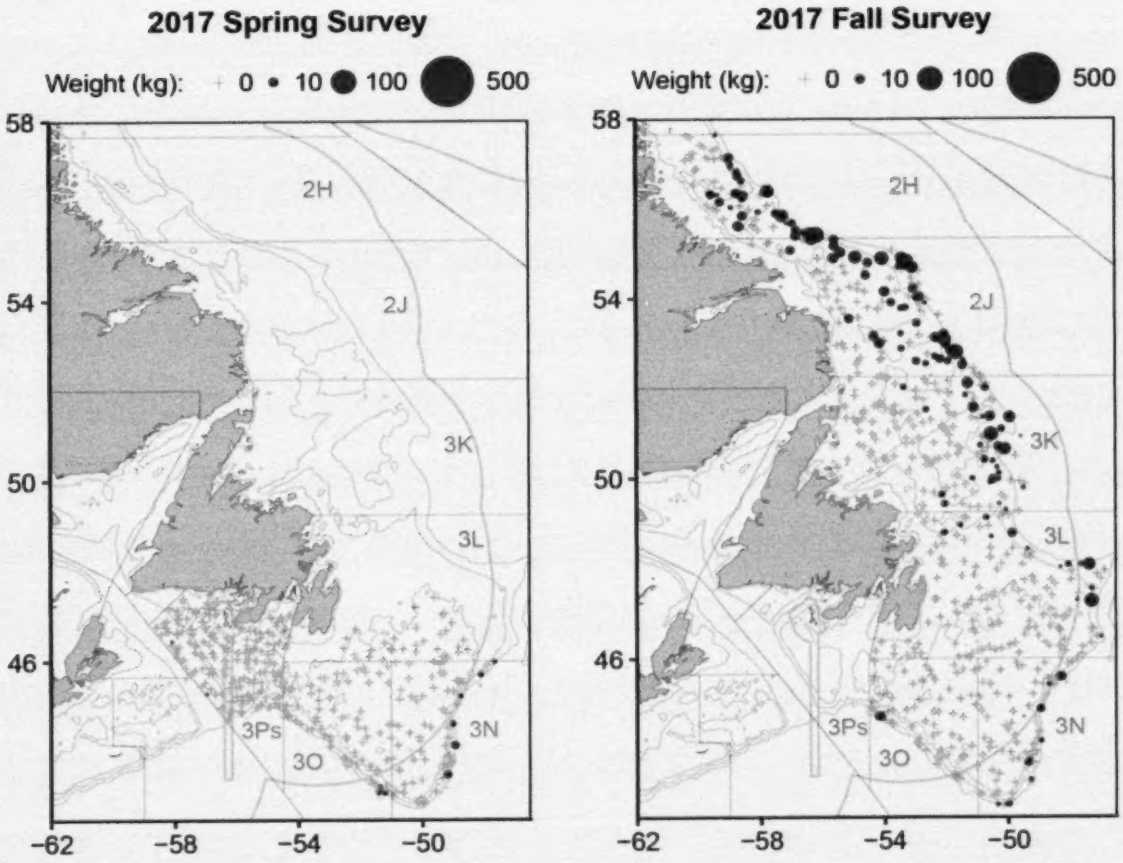


Figure 25. Broadhead Wolfish (*Anarhichas denticulatus*) in SA2+3 (continued).

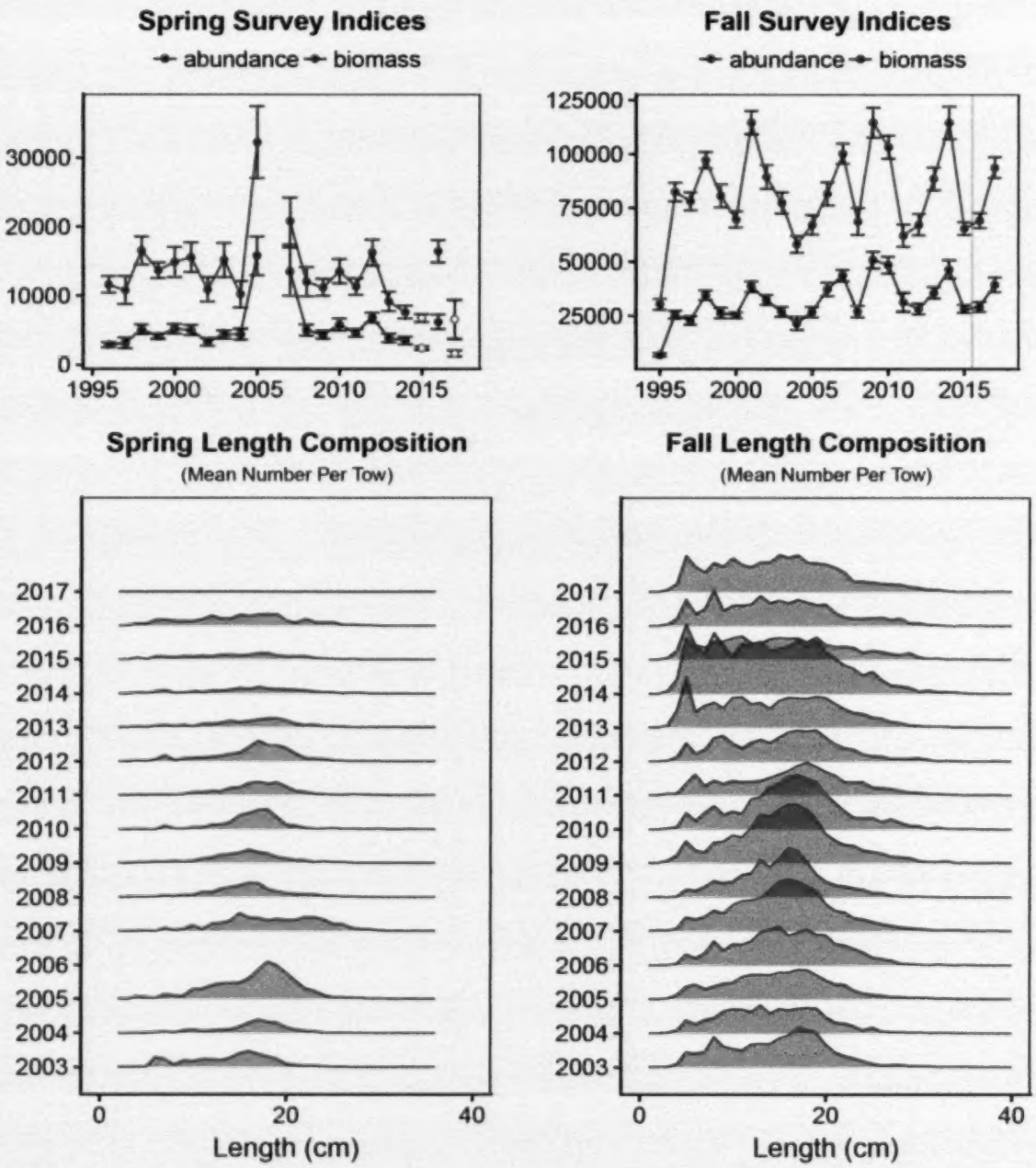


Figure 26. Roughhead Grenadier (*Macrourus berglax*) in SA2+3. Spring indices and length frequencies include data for Divs. 3LNOPs and those for fall include data for Divs. 2J3KLNO (2H has been excluded). Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Open symbols (above) and red frequencies (below) indicate questionable/potentially invalid data points due to survey coverage issues.

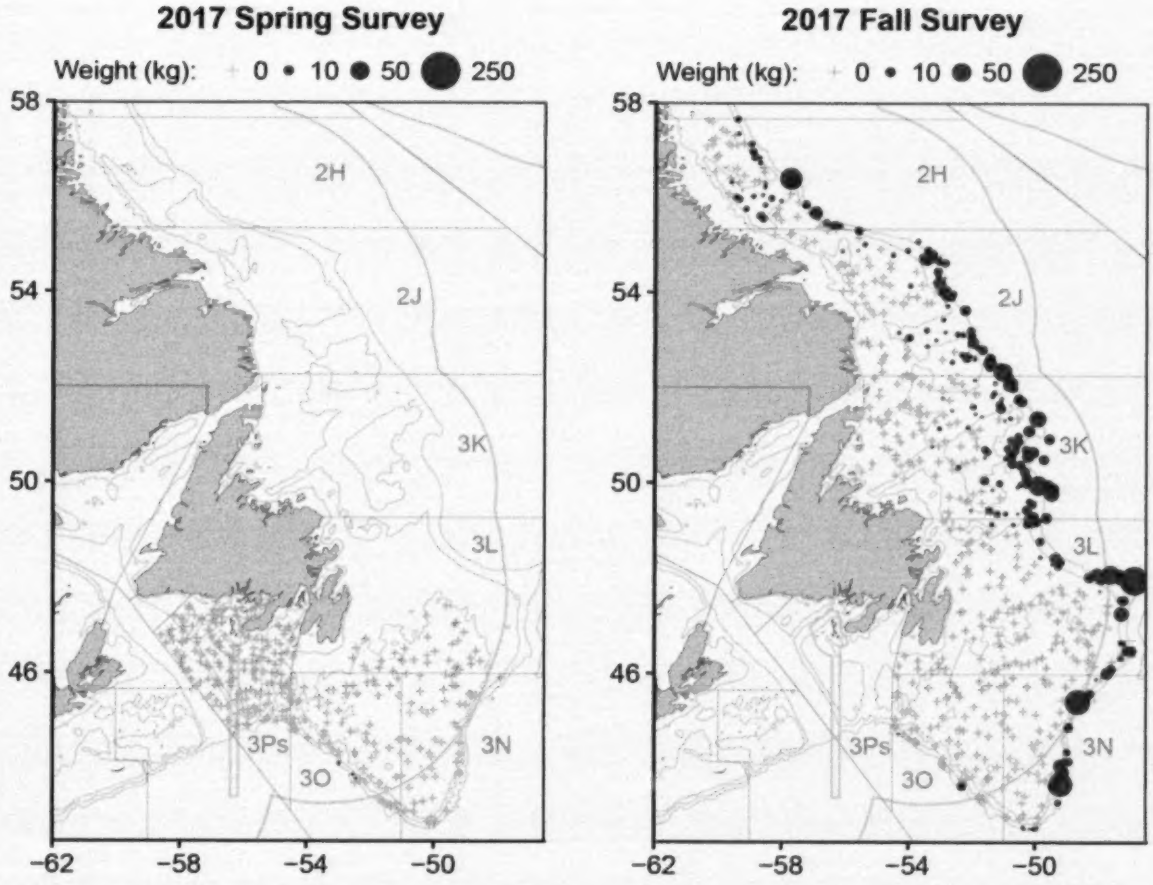


Figure 26. Roughhead Grenadier (*Macrourus berglax*) in SA2+3 (continued).

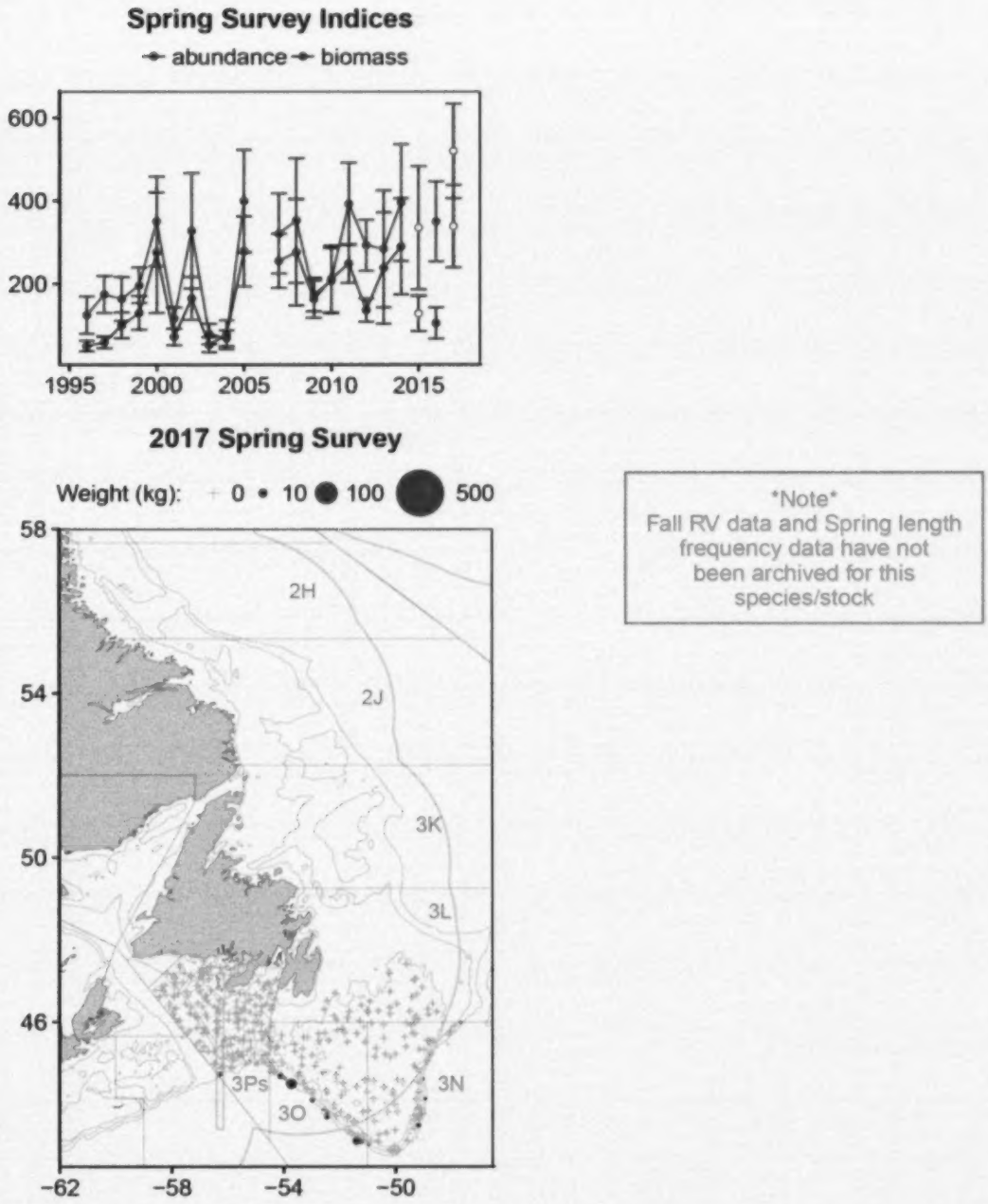
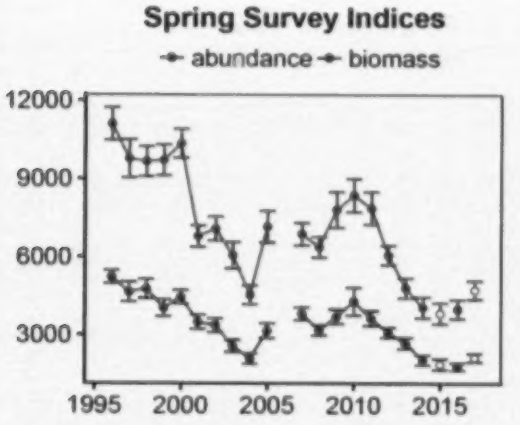
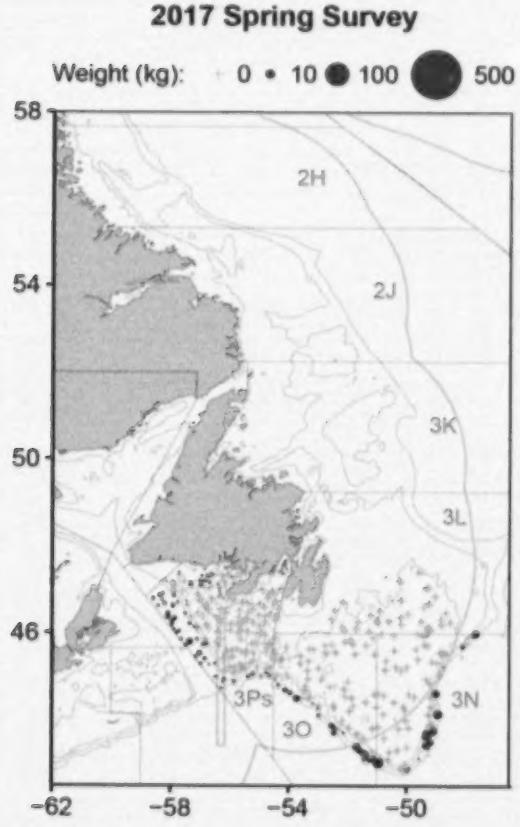


Figure 27. Roundnose Grenadier (*Coryphaenoides rupestris*) in SA2+3. The most recent assessment of this stock was based on autumn survey indices for Divs. 2J3K only and did not use data from the spring survey. The spring survey covers Divs. 3LNOPs. Open symbols (above) indicate questionable/potentially invalid data points due to survey coverage issues. Autumn survey data and spring length frequency data for this species have not been archived since 2011.





Note
Fall RV data and Spring length frequency data have not been archived for this species/stock

Figure 28. Common Grenadier (*Nezumia bairdii*) in SA2+3. The status of this stock has not been assessed. The spring survey covers Divs. 3LNOPs only. Open symbols (above) indicate questionable/potentially invalid data points due to survey coverage issues. Autumn survey data and spring length frequency data for this species have not been archived since 2011.

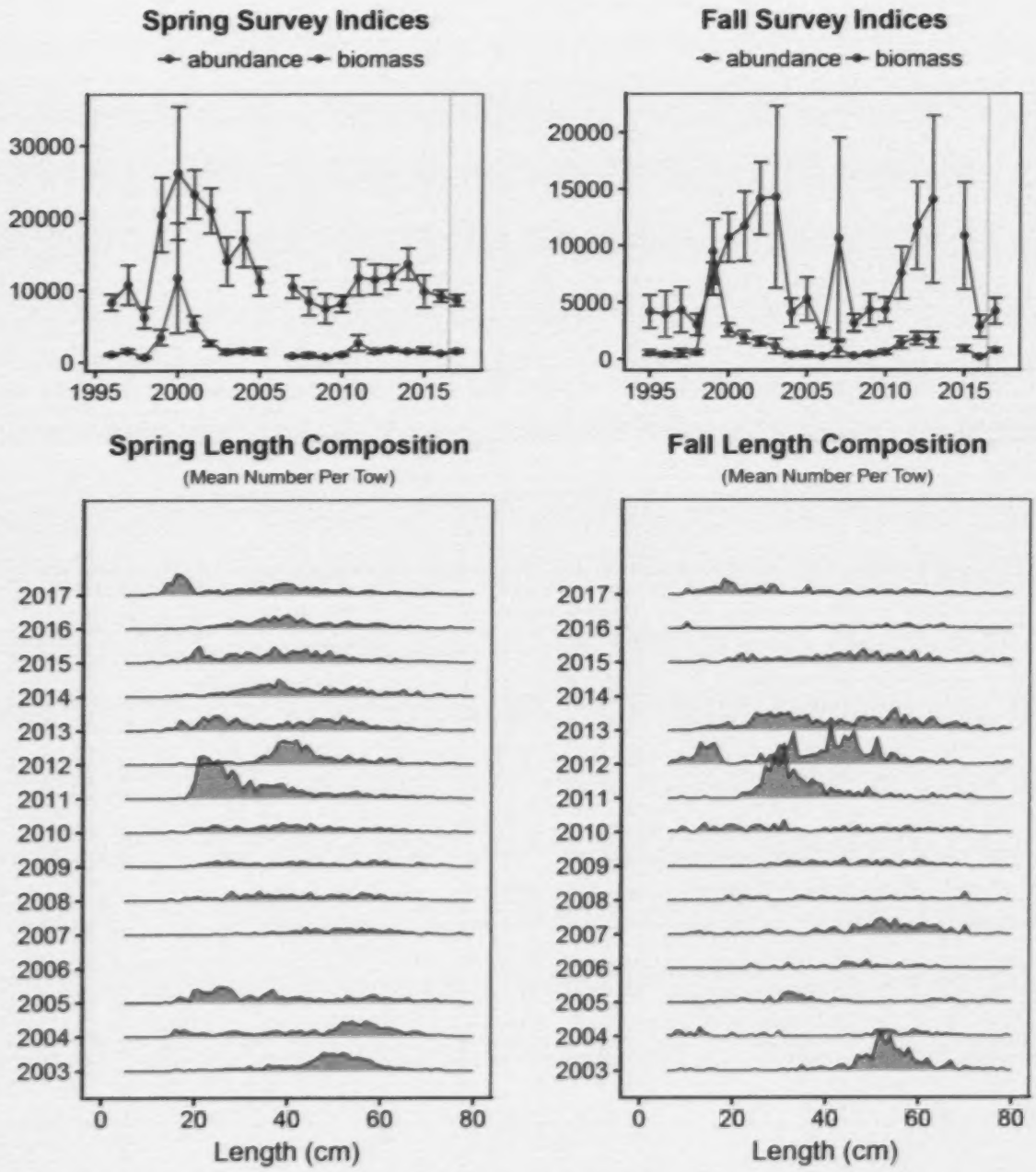


Figure 29. White Hake (*Urophycis tenuis*) in Divs. 3NOPs. Note that the autumn survey does not cover Subdiv. 3Ps. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed.

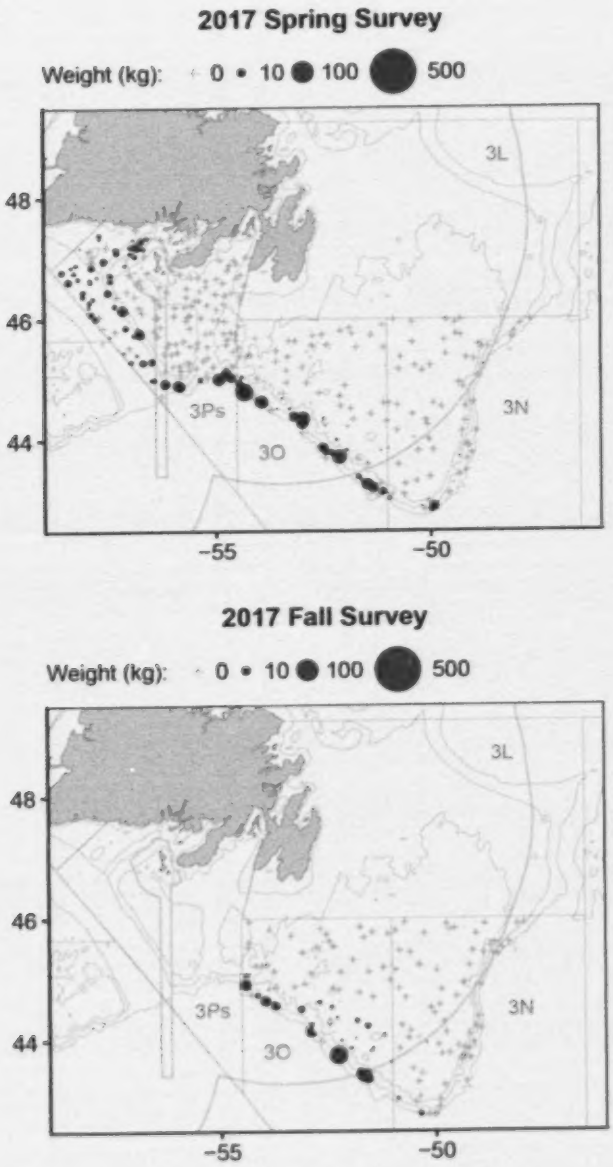
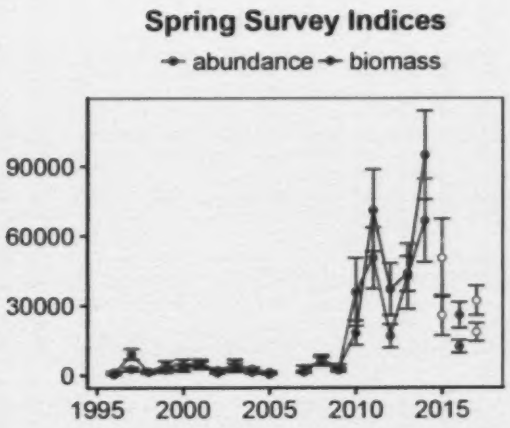
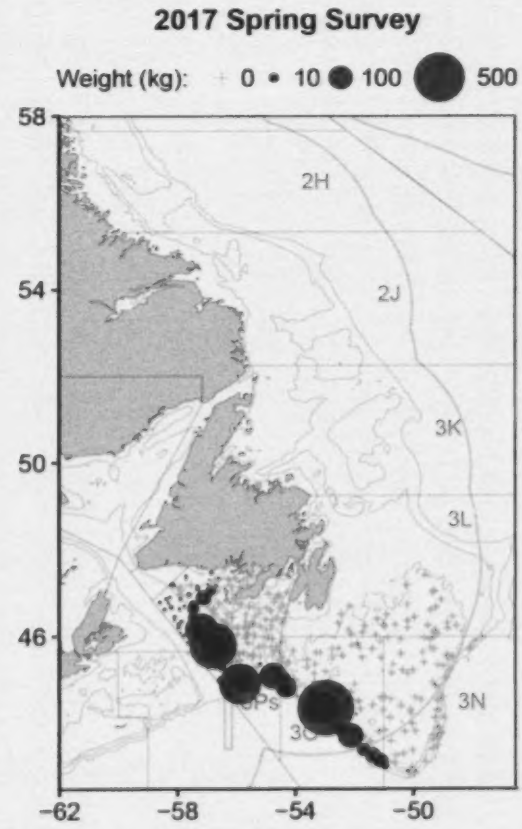


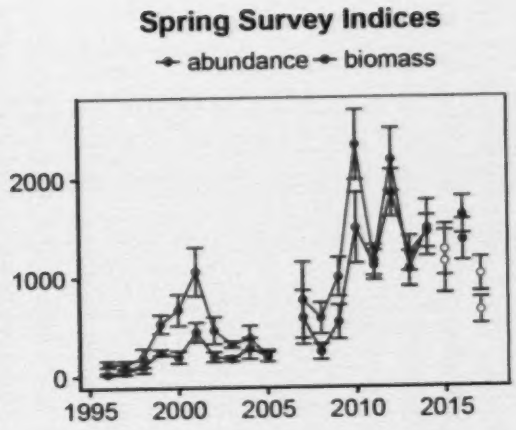
Figure 28. White Hake (*Urophycis tenuis*) in Divs. 3NOPs (continued).

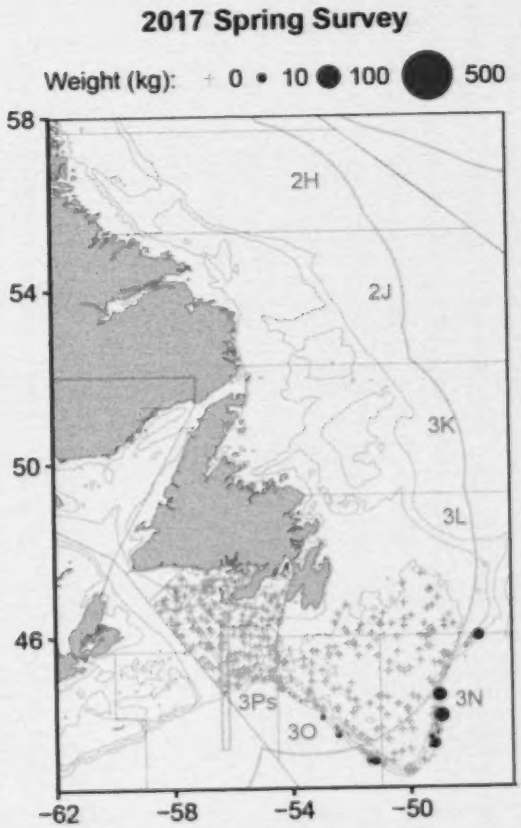




Note
Fall RV data and Spring length frequency data have not been archived for this species/stock

Figure 30. Silver Hake (*Merluccius bilinearis*) in SA2+3. The status of this stock has not been assessed. The spring survey covers Divs. 3LNOPs only. Open symbols (above) indicate questionable/potentially invalid data points due to survey coverage issues. Autumn survey data and spring length frequency data for this species have not been archived since 2011.





Note
Fall RV data and Spring length frequency data have not been archived for this species/stock

Figure 31. Blue Hake (*Antimora rostrate*) in SA2+3. The status of this stock has not been assessed. The spring survey covers Divs. 3LNOPs only. Open symbols (above) indicate questionable/potentially invalid data points due to survey coverage issues. Autumn survey data and spring length frequency data for this species have not been archived since 2011.

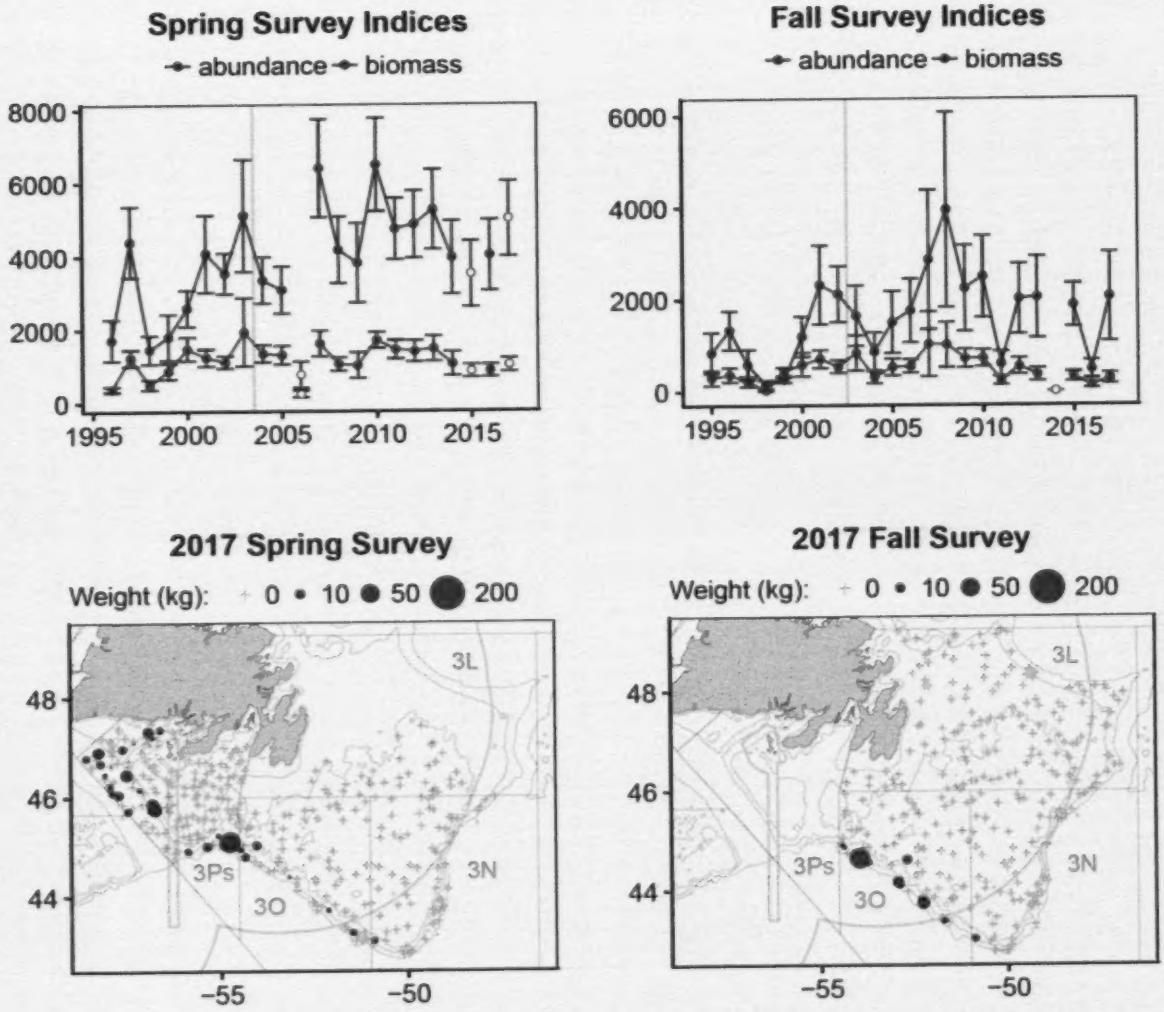


Figure 32. Monkfish (*Lophius americanus*) in Divs. 3LNOPs. Note that the autumn survey does not cover Subdiv. 3Ps. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed. Open symbols (above) indicate questionable/potentially invalid data points due to survey coverage issues.

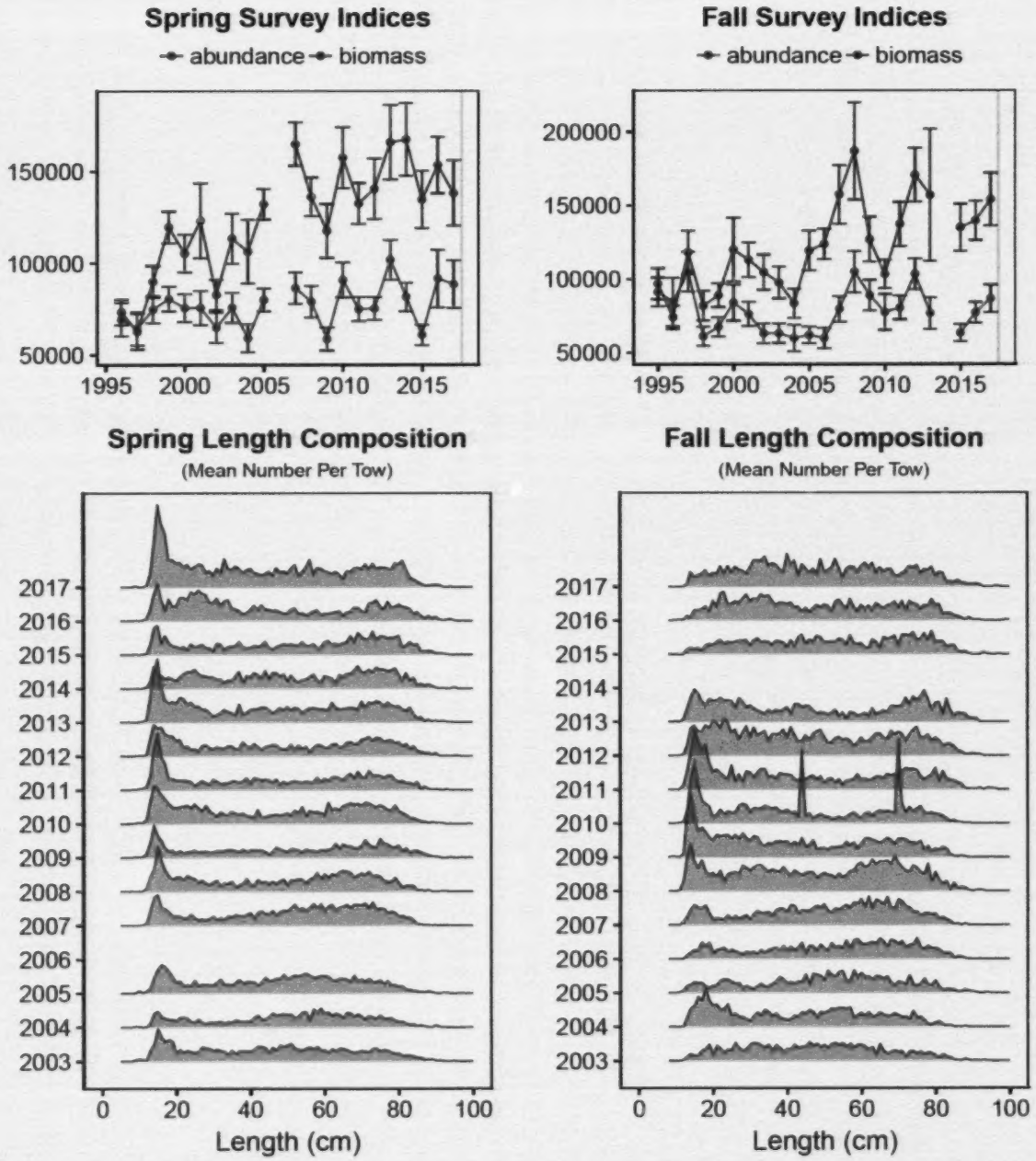


Figure 33. Thorny Skate (*Amblyraja radiata*) in Divs. 3LNOPs. Note that the autumn survey does not cover Subdiv. 3Ps. Data to the left of the vertical line(s) were used in the most recent assessment of this stock. Any data to the right of the line(s) have not been peer reviewed.

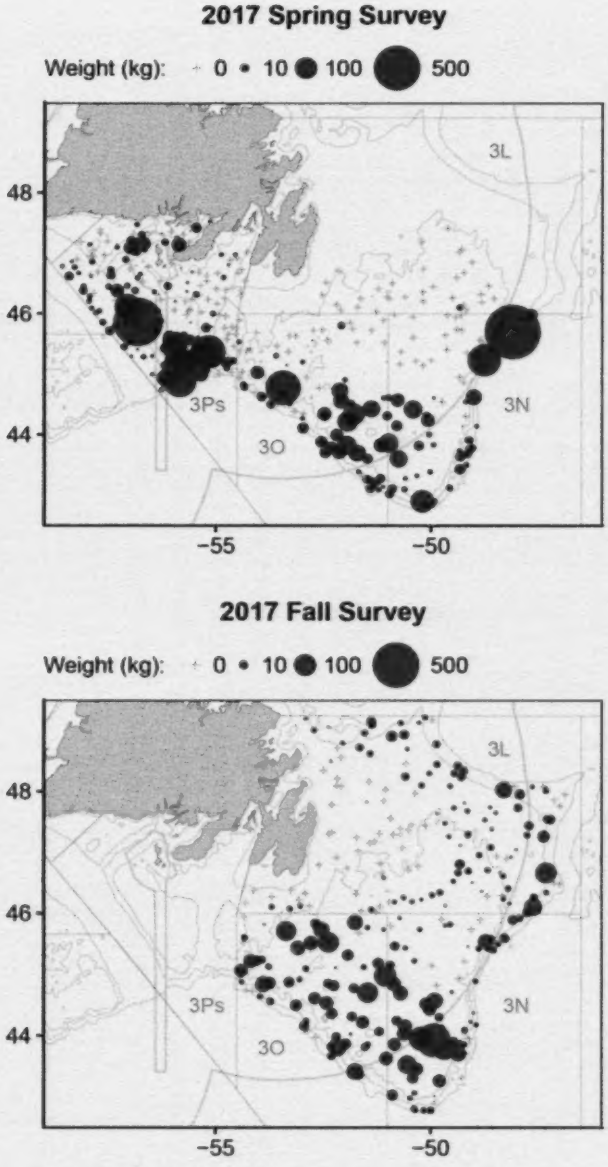


Figure 33. Thorny Skate (*Amblyraja radiata*) in Divs. 3LNOPs (continued).

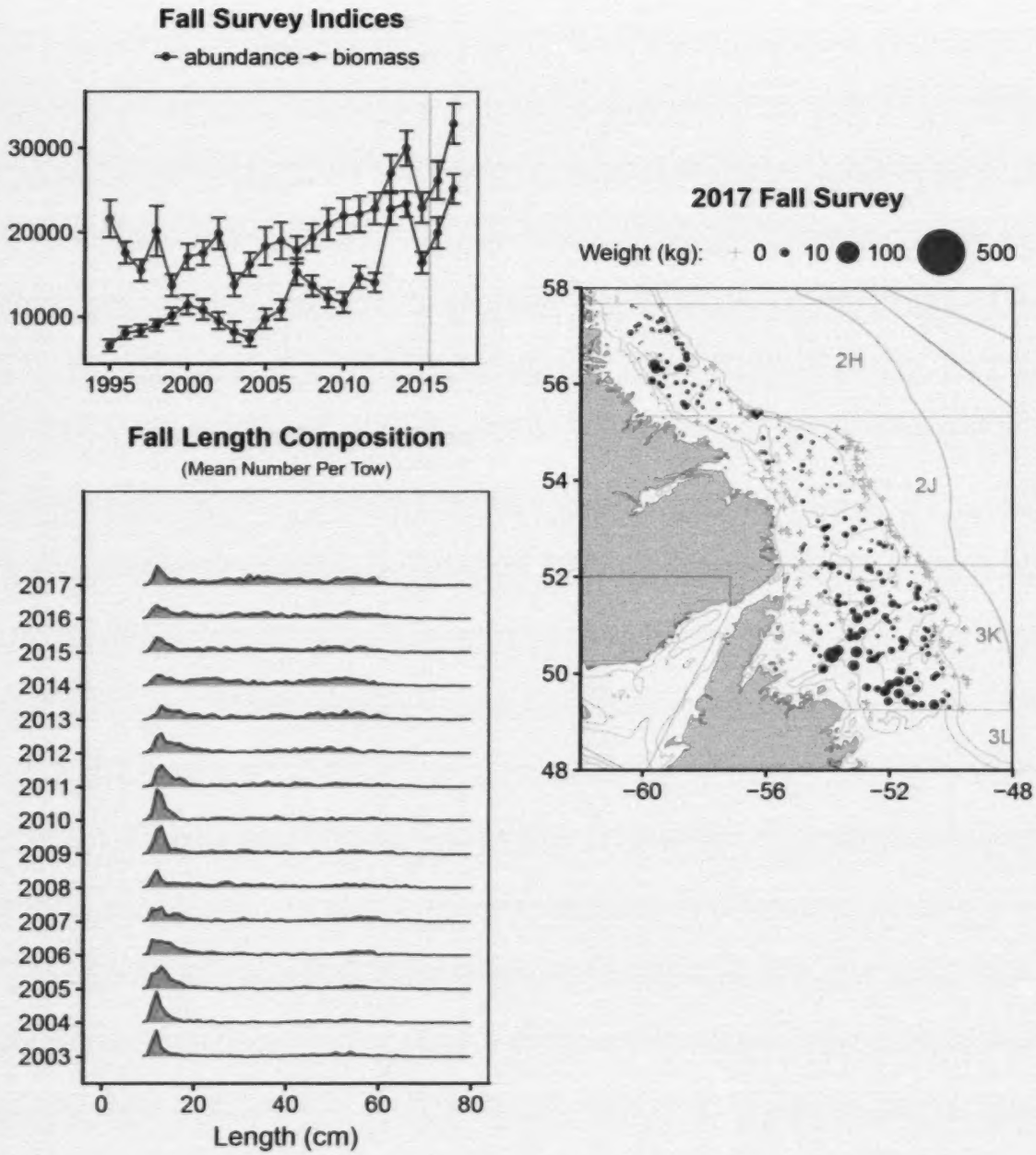
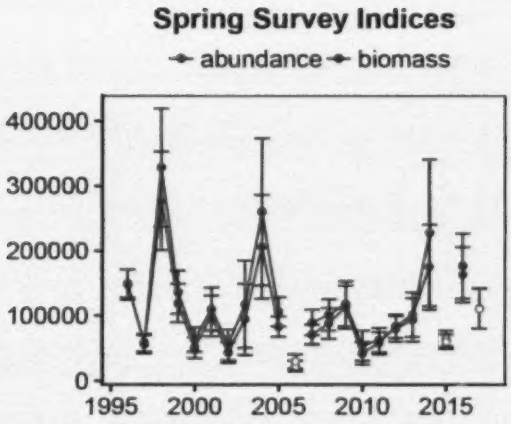
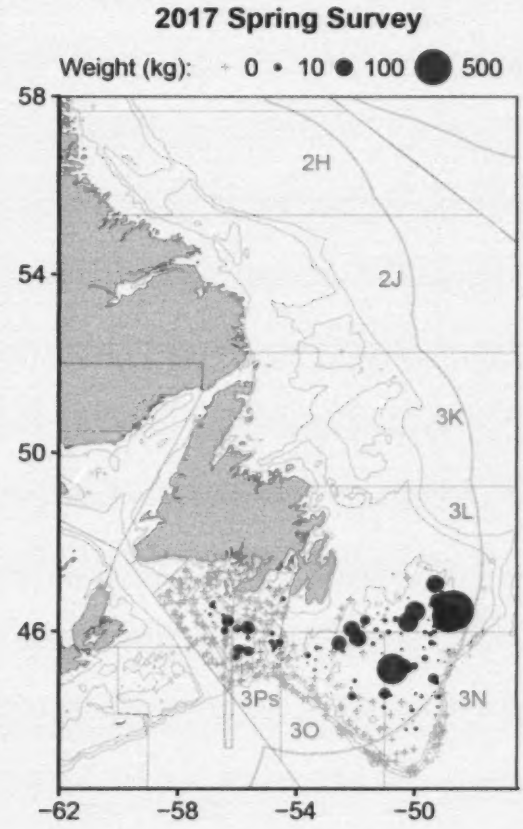


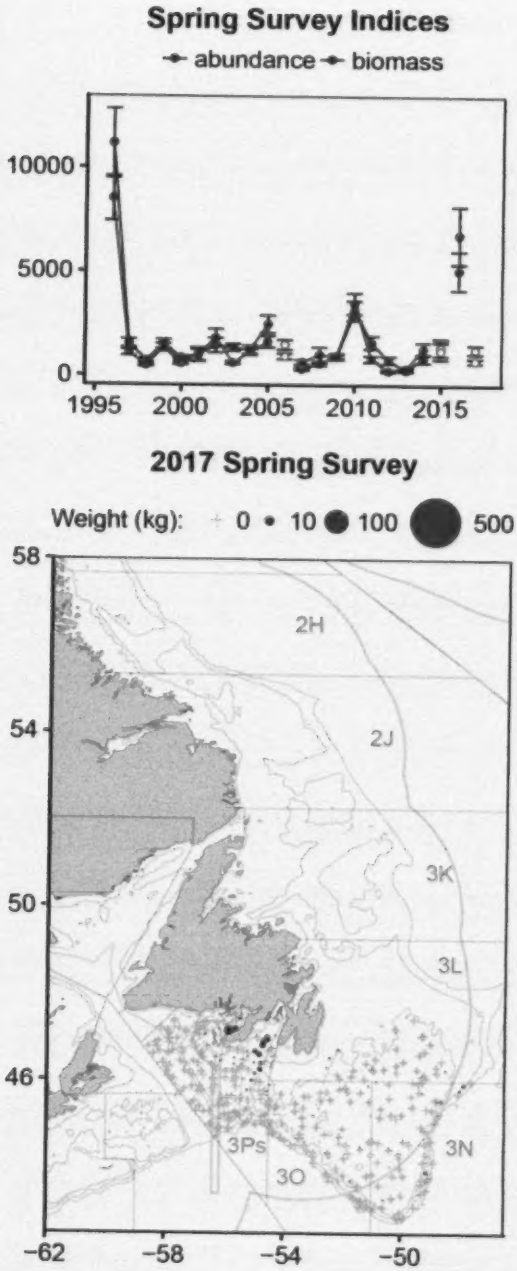
Figure 34. Thorny Skate (*Amblyraja radiate*) in SA2+Div. 3K.Note that only data for Divs. 2J3KL are included in the index and length frequency plots. Data to the left of the vertical line were used in the most recent assessment of this stock. Any data to the right of the line have not been peer reviewed. Note that the spring survey does not cover any portion of the stock area.





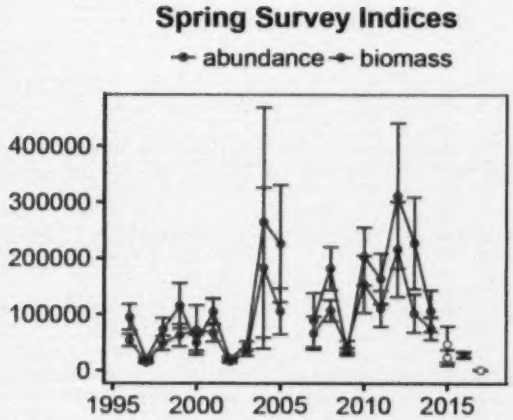
Note
Fall RV data and Spring length frequency data have not been archived for this species/stock

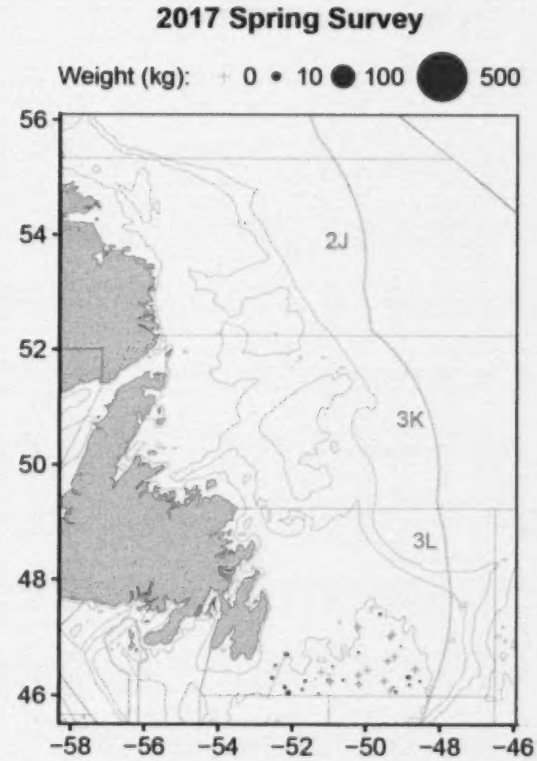
Figure 35. Sand lance (*Ammodytes dubius*) in SA2+3. The status of this stock has not been assessed. The spring survey covers Divs. 3LNOPs only. Open symbols (above) indicate questionable/potentially invalid data points due to survey coverage issues. Autumn survey data and spring length frequency data for this species have not been archived since 2011.



Note
Fall RV data and Spring length frequency data have not been archived for this species/stock

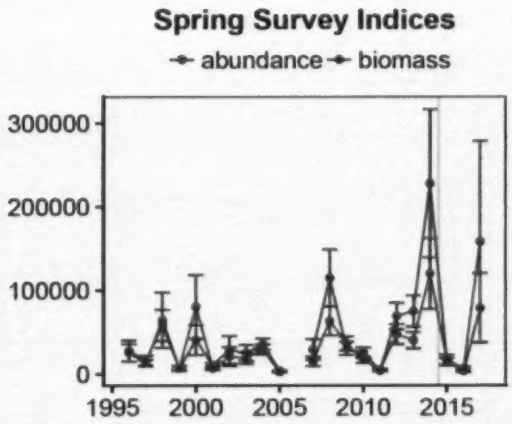
Figure 36. Arctic Cod (*Boreogadus saida*) in SA2+3. The status of this stock has not been assessed. The spring survey covers Divs. 3LNOPs only. Open symbols (above) indicate questionable/potentially invalid data points due to survey coverage issues. Autumn survey data and spring length frequency data for this species have not been archived since 2011.

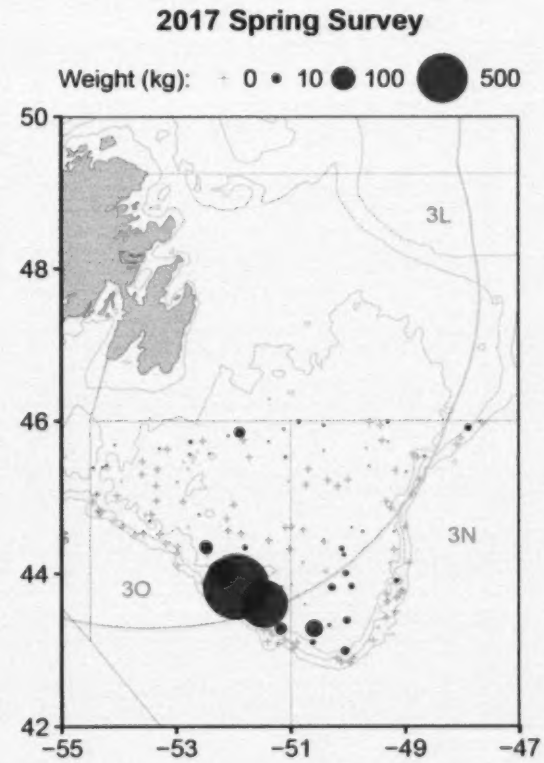




Note
Fall RV data and Spring length frequency data have not been archived for this species/stock

Figure 37. Capelin (*Mallotus villosus*) in Divs. 2J3KL. The assessment for this stock is based on an acoustic survey of a portion of Div. 3L rather than these survey data. Open symbols (above) indicate questionable/potentially invalid data points due to survey coverage issues. Autumn survey data and spring length frequency data for this species have not been archived since 2011.





Note
Fall RV data and Spring length frequency data have not been archived for this species/stock

Figure 38. Capelin (*Mallotus villosus*) in Divs. 3NO. Data to the left of the vertical line were used in the most recent assessment of this stock. Any data to the right of the line have not been peer reviewed. Autumn survey data and spring length frequency data for this species have not been archived since 2011.